

DEPARTMENT OF ENERGY LAB MANAGEMENT

HEARINGS BEFORE THE COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE ONE HUNDRED EIGHTH CONGRESS

FIRST SESSION

TO EVALUATE CHANGES OVER TIME IN THE RELATIONSHIP BETWEEN THE DEPARTMENT OF ENERGY AND ITS PREDECESSORS AND CONTRACTORS OPERATING DOE LABORATORIES AND SITES TO DETERMINE IF THESE CHANGES HAVE AFFECTED THE ABILITY OF SCIENTISTS AND ENGINEERS TO RESPOND TO NATIONAL MISSIONS

AND

TO CONTRAST THE MANAGEMENT OF SCIENCE AND TECHNOLOGY RESOURCES BY THE DEPARTMENT OF ENERGY WITH MANAGEMENT OF SUCH RESOURCES IN OTHER AGENCIES AND IN THE PRIVATE SECTOR TOWARDS THE GOAL OF SUGGESTING APPROACHES FOR OPTIMIZING THE DOE'S MANAGEMENT AND USE OF ITS SCIENCE AND TECHNOLOGY RESOURCES

JUNE 24, 2003

JULY 17, 2003



Printed for the use of the
Committee on Energy and Natural Resources

U.S. GOVERNMENT PRINTING OFFICE

89-162 PDF

WASHINGTON : 2003

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512-1800; DC area (202) 512-1800
Fax: (202) 512-2250 Mail: Stop SSOP, Washington, DC 20402-0001

COMMITTEE ON ENERGY AND NATURAL RESOURCES

PETE V. DOMENICI, *New Mexico, Chairman*

DON NICKLES, Oklahoma	JEFF BINGAMAN, New Mexico
LARRY E. CRAIG, Idaho	DANIEL K. AKAKA, Hawaii
BEN NIGHTHORSE CAMPBELL, Colorado	BYRON L. DORGAN, North Dakota
CRAIG THOMAS, Wyoming	BOB GRAHAM, Florida
LAMAR ALEXANDER, Tennessee	RON WYDEN, Oregon
LISA MURKOWSKI, Alaska	TIM JOHNSON, South Dakota
JAMES M. TALENT, Missouri	MARY L. LANDRIEU, Louisiana
CONRAD BURNS, Montana	EVAN BAYH, Indiana
GORDON SMITH, Oregon	DIANNE FEINSTEIN, California
JIM BUNNING, Kentucky	CHARLES E. SCHUMER, New York
JON KYL, Arizona	MARIA CANTWELL, Washington

ALEX FLINT, *Staff Director*

JAMES P. BEIRNE, *Chief Counsel*

ROBERT M. SIMON, *Democratic Staff Director*

SAM E. FOWLER, *Democratic Chief Counsel*

PETE LYONS, *Professional Staff Member*

JONATHAN EPSTEIN, *Legislative Fellow*

CONTENTS

Hearings:	Page
June 24, 2003	1
July 17, 2003	49
STATEMENTS	
JUNE 24, 2003	
Bunning, Hon. Jim, U.S. Senator from Kentucky	2
Domenici, Hon. Pete V., U.S. Senator from New Mexico	1
Hecker, Sigfried S., Senior Fellow, Los Alamos National Laboratory, Los Alamos, NM	18
Krebs, Dr. Martha, President, Science Strategies, Los Angeles, CA	8
Peoples, Dr. John, Jr., Director Emeritus, Fermi National Accelerator Laboratory, Batavia, IL	30
Postma, Dr. Herman, Oak Ridge, TN	3
JULY 17, 2003	
Domenici, Hon. Pete V., U.S. Senator from New Mexico	49
Gibbons, Dr. John H., President, Resource Strategies	58
Reis, Dr. Victor H., Senior Vice President, Hicks & Associates, Inc.	50
Schneider, Dr. William, Jr., Chairman, Defense Science Board, Department of Defense	61
Spencer, Dr. William J., Chairman Emeritus, International SEMATECH	54

DEPARTMENT OF ENERGY LAB MANAGEMENT

TUESDAY, JUNE 24, 2003

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 10:13 a.m. in room SD-366, Dirksen Senate Office Building, Hon. Pete V. Domenici, chairman, presiding.

OPENING STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. The hearing will please come to order. First, I want to apologize for being late, and thank the Senators for coming, the two of you. With this hearing today we begin a series of hearings devoted to the relationship between the Department of Energy and its laboratories and other facilities.

From these hearings, my goal is to develop a better understanding of how to optimize the relationship in order to balance the critical contributions of these laboratories towards national missions with increasing demands from the Department and Congress for "improved accountability," in quotation marks.

Recent discussions about contract issues at the laboratories have highlighted the fact that the criteria on which the Department judges the extension or competition on current contracts are all extremely vague. In addition, there have been many studies noting that increased micro-management of the labs, much of it in the name of providing increased accountability, has greatly complicated the ability of lab scientists and engineers to deliver on their critical national missions. In addition, there have been many problems identified at various laboratories encompassing security, environmental, financial, or administrative issues. These concerns increase desires to provide still more micro-management for the laboratories.

With the current decision to compete the Idaho and Los Alamos contracts, this is an appropriate time to explore these issues. In today's hearings, I hope we can explain the changes that have occurred in the relationship between the Federal Government and the lab scientists and engineers. We need to understand how these changes may have complicated their ability to address national missions.

In a second hearing set for July 17, we will hear from witnesses with experience in multiple Federal agencies or with experience in both the private sector and a Federal agency. From that hearing,

we can better understand how the DOE's labs are viewed relative to other Federal or private laboratories.

In future hearings, we will hear from leaders of some of the studies that have explored the productivity of the DOE labs and ways to increase their productivity. In addition, I plan to hear testimony on the various contract models that are now used by the Department, with the hopes of exploring "best practices" that might be applicable to more of the labs.

We have four witnesses today. Each of these witnesses has great leadership experience, either within the laboratory or from the vantage point of the Department.

Dr. Herman Postma served as Director at Oak Ridge under both Union Carbide and Martin Marietta. He has served for 12 years on Sandia's advisory board. His career at Oak Ridge included the Atomic Energy Commission, the Energy Research and Development Administration, and the Department of Energy leadership.

The Honorable Martha Krebs—nice to see you again—served as subcommittee staff director at the House Committee on Science. She has held management positions at Lawrence Berkeley lab before she served as Director of the DOE Office of Science. She is now president of Science Strategies. Her experience includes views of the labs from DOE headquarters as well as from within the laboratory.

Dr. John Peoples has been with Fermilab for more than three decades. He served as director from 1989 to 1999 of that institution, and is now Director emeritus of the lab. The single-purpose labs of the Department provide critical facilities to our great Nation and the world of science. Dr. Peoples brings the perspective of these single-purpose labs to today's discussion.

And finally, my good friend, longtime friend, Dr. Sig Hecker, it is so great to see you again. I hope we speak a little bit after the hearing. He joins us from Los Alamos, where he is now a senior fellow. Sig served as Director of the lab for 11 years, from 1986 to 1997. He has been associated with Los Alamos in various ways over the last 38 years. Over many years of working with Sig, I know he has carefully considered the changes in the Department's governance of the laboratories.

With those introductions, let us begin with you, Dr. Postma, and proceed with the rest of the witnesses. Your written testimony will be made part of the record now, so you don't have to worry about that. Limit your oral arguments to 5 minutes. The clock is right up here in front. Please proceed.

[A prepared statement from Senator Bunning Follows:]

PREPARED STATEMENT OF HON. JIM BUNNING, U.S. SENATOR FROM KENTUCKY

Thank you, Mr. Chairman.

I appreciate having this opportunity to take a look at the Department of Energy's contractors.

This hearing will focus mainly on the Department of Energy's project management and contracts at its national laboratories. These laboratories play an important role in our national security.

As some of my colleagues on the committee know, the Paducah uranium enrichment plant is located in Paducah, Kentucky. And while it is not a national laboratory, I think this hearing may help answer some project management and contract questions I have about the Department of Energy's role in cleaning it up.

We have been dealing with contamination at the uranium gaseous diffusion plant in Paducah for some time now. After more than five decades of operation at the Paducah plant, there is now severe contamination from improper disposal of hazardous and radioactive materials at the site.

The progress with cleaning up the site has been very slow. The schedule for clean-up at the plant has been repeatedly delayed and projected costs have increased. Currently, the plant is proposed to be cleaned up by 2024.

The Paducah plant has had several contractors to manage the cleanup over the past decades. The Department of Energy recently announced its plan to rebid the Paducah contract. I am hopeful that the Department of Energy's new contractors will work hard to efficiently cleanup the site.

I look forward to hearing the testimony from our witnesses today about issues concerning the Department of Energy's project management and contracts. I hope that what is revealed today and in subsequent hearings will help to improve the cleanup at the Paducah plant.

STATEMENT OF DR. HERMAN POSTMA, OAK RIDGE, TN

Dr. POSTMA. Thank you. Thank you, Mr. Chairman, and Senators. It is good to be here. I want to start off with what I call the top line or the bottom line, which is that the relationship between DOE and its laboratories has been fundamentally sound for about 60 years. These are some of the very best laboratories in the world, and in order to be so they had to change over that period of time into many different things and different ways.

They have successfully done so, but that does not mean they are perfect. It does not mean that the relationship could not stand some improvement, as every organization that is an organization must confront those things which influence it and make changes appropriately.

I have some observations on the structure and the governance of that relationship. I call some of them Postma's laws. This is taking off a little bit after Augustine's laws, except they are not as funny as his were. One was the action-reaction law, that any time DOE did something to change the structure, we could count on about 8 to 10 years later they would precisely undo what they had done for exactly the opposite reasons, and we would go through that cycle again. There is what I call the "music man theory," in which contractors have great resolve in formulating precisely their proposal, finding out ways to precisely improve everything in all kinds of ways, except they do not know the territory. When they get in, they find things are quite different and have to make appropriate modifications, in often too fast a manner.

There is the bait-and-switch theory, in which some of the winning team stays together for a year or two and then runs off to another proposal, in which case there is another transition that takes place.

There is the halo theory, which I have also called the wave theory. This has to do with the initial halo effect. A new contractor arrives with the Department of Energy and looks good because they bring in a good team. They sort of like it after a while, and then they start bidding on new proposals from the Department of Energy, and DOE is enamored with that. Pretty soon, we have a company that has four or five contracts and a substantial part of DOE's business.

Well, somebody stumbles out of those organizations, and then everybody looks bad from that contractor. The latest case was Martin Marietta-Lockheed Martin, but you can go back through the history

and look at Westinghouse, who rose and fell; EG&G, who rose and fell; Lockheed Martin, who rose and fell; and now Bechtel, where there are signs of a little crumbling here and there, and disenchantment by the Department of Energy. So there is an anti-halo theory, as well.

There is another thing, living with your sins. The contractor and team don't stay long enough together to see that what they started, they have to live with the results. That is, don't cut and run. Don't go do something and get out of town before your sins catch up with you.

There is the "breaking the back" theory, which is not a theory. This says the demands, audits, and everything performed by the Department of Energy on contractors and the contractor's mother organization also does the same thing, turn out to be in many cases an unbearable load.

I remember one time there were 23 audits going on in my organization at the same time by outsiders. That is an awful lot to bear.

It was also impacted by what I call the "closet dictator." There are some people who have been waiting in the wings for years to get even one way or another. As soon as something happens, they can jump on the perpetrator of that misdeed and just pounce on them with a lot of new rules.

There are some good changes. They have to be good, because if you don't change, well, you will be changed. But there are ways to avoid these problems. I think better consideration to fit the contractors with the job is important, like a science lab should have strong university involvement as either single or consortia; that the comprehensive energy laboratories should have strong university and industrial teams, because they do have a mix. The lab should have strong industrial teams, and the university has a role as well.

The production complex should have strong industrial contractors. I think the contractors ought to be around long enough, but there maybe ought to be some limits. Currently, the rule is, DOE bids for a 5-year contract, extends for 5 years more, unless things are not great, and gets rid of them. I think that is too hard and fast a rule. I have found, for example, in looking that Lockheed Martin has a contract with a team member in the United Kingdom and they just got a 25-year extension, which would be unheard of.

There is another contractor here in the United States, a Department of Energy contractor, who normally would get a 5-year contract and had been doing very well, but they are only going to get a 1-year contract extension at a time. No one can plan well with this kind of thing.

The original Procurement Policy and Acquisition Act said that long-term relationships should be the expectation. "Long-term" has a quite different meaning. It does not mean forever, and it should not mean forever; but it should not mean 5 years or 1 year at a time.

The contractor team longevity should be part of the contract. The contract ought to include community involvement where it is appropriate. I believe strongly that technology transfer ought to be restored as an incentive within such contracts to help the American economy and to make sure that the work done at laboratories gets out.

Particularly, I think there ought to be an encouragement of Sandia-like experiments and more appropriate governance. John Gordon testified about 16 months ago about a new governance model for Sandia. His testimony is quoted in here, but it has fallen on deaf ears, apparently. What started off as a great intention of allowing more self—not control, but more self-audits, more rules internally, and more things really appropriate to industrial practices, has been thwarted essentially by a contract extension and nobody doing anything. I viewed this as a step forward, but apparently it has fallen into disarray.

Don't attribute the transgressions of one lab to all labs. Not all labs are alike. Not all of them had the transgressions. If someone does something bad, penalize them; don't penalize everybody. I think that nurturing future laboratory directors from within is important. They should have outside experience early in their career. But too often we find that people brought in from the outside completely fresh to the system are shocked by the system, and sometimes cannot exist within it. It is so alien to their past practices that they have sometimes left after only a few months.

I believe one of DOE's most important roles is to make sure that the right person for the prime leadership role is chosen, and stand behind that person as they are learning.

Finally, I believe that the GOCO structure, government-owned and contractor-operated, has served the country very well. It has gone through some ups and downs. It can be improved. But 60 years of outstanding performance ought to stand for something. Thank you.

[The prepared statement of Dr. Postma follows:]

PREPARED STATEMENT OF DR. HERMAN POSTMA, OAK RIDGE, TN

INTRODUCTION

Bottom (top) line: The GOCO (Government Owned Contractor Operated) governance of DOE Laboratories has served the U.S. extremely well yielding some of the best labs and best science and engineering in the world. These laboratories founded during or immediately after WWII were at the beginning comprehensive and dominated both the performance of the Nation's science agenda and quality for many years. Today there is much more competition from other national labs (National Institutes of Health, NASA, Agency) in the U.S. and abroad and not surprisingly that early dominance is not as great. But to have maintained a strong leadership role for these 60 years as science, governments, budgets and priorities have changed, is a testimony to their ability to morph, change, adapt, create, and reinvent themselves many times. But I believe that those changes have been made more difficult because of unwise practices, undue burdens and unnecessary mistakes. There are lessons to be learned from past experiences, which I will try to recount some here with some ideas for avoidance in the future.

HISTORICAL OVERVIEW ON STRUCTURAL AND GOVERNANCE

Early day relationships had very short contracts, no competition, fewer rules, regulations, and orders and there was a consistent joint focus on ability to get work done. Lab Directors often got together themselves in 70s and 80s to compare notes and forge some common directions to improve the labs overall-best practices in today's jargon. These confabs were later attended by field office and then became HQ oriented (so the early format died).

Various structural formats exist in today's FFRDCs (Federally Funded Research and Development Centers): Primes, Teams, Intramural/Extramural, Agency Labs, GOGO, GOCO, COCO and some joint arrangements of private/DOE common labs (at PNL.) But it is primarily GOCO throughout DOE. There is no one very best and obvious mode or everyone would be going in that direction.

Personal Observations lead to Evolution of Postma Laws (some result from Fads, Foolishness, and Fickleness):

Action-Reaction Law: Most past actions in taking things apart have later reversed those actions to put back them together again after several years lapse (Hanford + others).

Music Man Theory: Contractors who have great resolve in formulating the proposal find that upon winning they didn't know the territory as well as they thought and many things are either not possible or are too daunting.

Bait and Switch Theory: Sometimes the winning team stays together as such only long enough to put some changes in place and then that crew becomes the leadership for a new proposal elsewhere.

Halo Theory: New contractors seemingly enjoy an initial halo effect (look really good and can do no wrong) and quickly get other contracts (a significant fraction of DOE contracts) after nabbing the first one—Westinghouse, EGG, Lockheed Martin, Bechtel—but then rapidly fall from grace (halo shatters) after a few years and even disappear entirely from that business.

Why this rise and fall? Theories abound. Shallow reserve of talent, lose interest, can't make money compared to core business, changing priorities within company. The converse is also true (anti-halo?). When DOE sees failure in one contract, it carries over to all of that company's contracts and thus gets rid of them all in an equally short time period.

Living With Your Sins: Contract and team ought to stay long enough to see the outcome of their changes but not so long as to become too comfortable, arrogant or irrelevant.

Breaking the Back (Not a Theory): Increasing demands, regulations, rules, simultaneous audits make the job unnecessarily hard to perform. Every review committee (latest was Galvin) has denounced the overbearing bureaucracy and its impact on getting the job done. I believe there is also the role of the "closet dictators" in which some people extract vengeance for past sins or multiply the intent of the original order by laying on extra levels of compliance.

Good Changes: Some of this change is inevitable since times change, missions change, interests change, so contractors must change or be changed. Also time causes "bureaucratic creep". Easy mechanisms seem to exist to increase the loads but not to reduce them. Unless a significant recent exception becomes implemented: the NNSA has made several good changes and Sandia has been approved to suggest an innovative team approach to governance.

SOME WAYS TO AVOID THESE PROBLEMS

Better Fit the Contractor(s) With the Job

Science Labs should have strong University involvement (single or consortia).

Comprehensive Energy Labs should have a strong University and industrial team.

Weapons Labs should have strong industrial and University team.

Production Complex should have industrial contractors.

Keep Contractors Long Enough But Also Consider Some Limits

Good Procurement Rules Exist Now: Currently and normally DOE bids five-year contracts with a very likely one five-year extension but then competitively rebids if longer (including current holder). Beware of "If you compete it that means you don't love us and we won't play" (They almost always do). Some other contracts indicate the spread of what is deemed an appropriate time: the UK in March 2003 extended a contract to Lockheed Martin and partner for 25 years for managing its weapons production. Conversely DOE recently conditionally and narrowly extended a well-performed contract (normally 5 years) for only 1 year.

The Office Federal Procurement Policy (Letter of 4/4/89) and FAR (Federal Acquisition Act) on FFRDC 35.017 section 4-both argue toward the establishment of "long term relationships" as the expectation. Long term has a quite different meaning now.

New Kind of Limit: Limit contractors to holding few contracts whether prime or as team member regardless of mix and match unless a compelling overall need and commitment is there-not a fill in for other work, not a bait and switch, deep management talent, not a place to "put" people. Avoid the halo effect. Spread the competitive net to get other interests and views involved.

Have contractor team longevity as part of contract. Keeping a good team together long enough to accomplish promised changes and train successors. Have community involvement as part of contract. Have contractors commit in the bid to explicit community involvement and investment. It is important to the government interests to be a good corporate citizen and to have the mission's acceptance widespread in the

region especially in communities in which DOE is dominant. Good community involvement increases tolerance for future mission changes.

Restore Technology Transfer as incentive. Make sure contractors establish a strong technology transfer program to create strong American technology-it is a national security issue (security and economic) and has been diminishing in last decade and doesn't seem to be in the DOE mission any longer.

Encourage Sandia like experiments in more appropriate governance. Sandia received permission in 2001 from NNSA to think about a series of simplifications toward more self-audits, fewer and better orders. Sandia started a series of suggestions based on successful industrial approaches that would return more people to the bench within the same money constraints.

As General John Gordon testified 16 months ago:

"A new governance model will be designed to capitalize on the private-sector expertise and experience of NNSA's management and operating contractors while simultaneously increasing their accountability for high performance and responsiveness to NNSA program and stewardship requirements."

"The governance strategy will be accompanied by an assurance model that will rely as much as practicable on third-party, private-sector assurance systems such as comprehensive internal auditing, oversight by boards and external panels, third-party certification, and direct engagement between oversight bodies and NNSA's leadership."

Progress Report to Congress on the Organization and Operations of the NNSA—February, 2002 By Gen. John Gordon

The Sandia advisory board of which I was a member thought that to be a very encouraging development and strongly urged its speedy implementation. Unfortunately that early enthusiastic start has been greatly slowed down due in part to negotiating it into a contract extension.

If and when progress once again resumes, I hope all parties would refrain from jumping all over Sandia for simple mistakes during this trial and transition period.

Don't automatically attribute the transgressions of one lab to all labs. Deal out penalties accordingly. Too often when one lab makes a mistake it is assumed that all labs have same attitude and warrant the same orders. Limit the punishment to the transgressor and proportion the punishment to the transgression.

Nurture cadre (cross fertilization) of future lab directors from within. Too many brand new "outsiders" have had problems adapting. The labs ought to be encouraged to develop management talent used to dealing in the DOE culture but also encourage and acquire those high potential people who have some outside experience in other settings. When top officials come in cold from the outside they too often are in shock at the contrasts and limitations. Talent developed earlier in career ought to be made available to other labs to cross-fertilize. Complete outsiders are appropriate more if things are seriously broken and need vast overhaul and fresh insights.

Be very hesitant to jump on transgressions with new heavy rules. Often the 1% mistake will increase new rules by many fold. Every outside review undertaken of the labs has emphasized that too much of scientist's time is taken with foolishness having nothing to do with the goal. This has not been reduced despite more than a decade of concerns and recommendations. Be prepared to push DOE to NNSA like steps if DOE cannot do it on its own.

DOE's most important role. Just as a board's most important job whether corporate or university is to choose the right person for the prime leadership role, so too is that DOE's most important consideration is in vetting the initial contractor's choice, later retention and renewal.

CONCLUSION

I firmly believe that the GOCO structure in DOE has served the country very well but that there are always improvements possible and that some things need to be changed. Just as even great scientists change interests, fields and approaches to stay relevant, so too must DOE and its laboratories constantly seek out those changes that improve the ability to get the right things done right. Among those are recognizing that the C in GOCO is being constantly diminished to the detriment of the system and the country There are excellent models to every mode for improvement suggested in this testimony.

The CHAIRMAN. Thank you very much. I appreciate your testimony.

Dr. Krebs.

**STATEMENT OF DR. MARTHA KREBS, PRESIDENT,
SCIENCE STRATEGIES, LOS ANGELES, CA**

Dr. KREBS. Mr. Chairman and members of the committee, it is a great honor to appear before you and the committee again. I appreciate the opportunity to discuss the subjects of the hearing. As you know, most of my professional career has been involved with the Department of Energy, but I have served inside and outside the beltway a number of times.

At first, when I was a staff member of the House committee, I was here when the Energy Research and Development Administration transferred or transitioned into the Department of Energy. I read and reviewed at least three major studies during that time on the laboratories and their contracts.

At the lab, I watched certain committees here in the Senate and on the House side review business practices and disagree with judgments that were made by laboratory and Department of Energy managers at that time. I also saw the tiger teams created, and the creation of the Office of Environmental Management, as well as an increased oversight responsibility for the ES&H programs in DOE.

Finally, when I had the great honor to serve as the Director of the Office of Science, I had responsibility for 10 of those laboratories, and was part of a contract reform initiative, another review by the Secretary of Energy's advisory board with respect to the laboratories, and the recompetes of the contracts for Brookhaven and the Oak Ridge National Laboratory. I would recount this history—and I do so in more detail in my testimony—to show how the Department has grappled with the role of the laboratories, their missions, the technical and business management, and the extent to which laboratory contracts result in under- or over-management by the Department of Energy.

What began in the AEC as a clear concept of what was required to manage unique research and development for a high national purpose has diminished to concerns about good contract law.

When I served at the Department of Energy and had occasion to testify here and before other committees, I always focused on the positive, because the Department's mission was important, and its laboratories had made so many contributions to that mission. Here today I have tried to convey the difficulties that face the DOE and its laboratories. I do not excuse the laboratories' deficiencies, some of which I certainly know to be real.

I have also observed occasional misjudgments by laboratory and contractor leadership. I do not oppose recompetition of laboratory contracts categorically. As I said, I was involved in two of them. However, I also believe that since the creation of the Department there has been well-meaning, often unintentional, but ultimately and unfortunately malign neglect on the part of the internal and external programmatic sponsors of the laboratories.

In general, I considered myself one when I was in the Department of Energy, and there, as I did often in my career, I placed an emphasis on keeping the money flowing, and assumed that the organizational issues would be overcome.

The oversight and management elements of the Department and of the Congress, which are not responsible for delivering the De-

partment's mission, have not been effectively countered by program sponsors. I think of the Senate Committee on Energy and Natural Resources, Armed Services, the Appropriations Committee, as programmatic sponsors of the Department.

Other agencies suffer embarrassments for their ineffectiveness, but they are rarely browbeaten. They are not expected to change their procurement policies, and their contractors are rarely removed, despite overruns, schedule slips, and occasional ethical lapses.

Although much criticized, the Department has a real and important mission. It is complicated, but it has four clear elements: energy, the nuclear weapons stockpile, environmental management, and science. There may be questions about the policies that underlie these missions, but it is not the Department of Energy's sole responsibility for brokering agreements on policy.

When there have been disagreements about policy, I often see that the content and competition of the management and operating contracts for the laboratories have become one of the hobbyhorses that critics have ridden.

Changes in policy or its interpretations may change programmatic content, but each of the mission elements will need R&D to achieve its goals. The DOE laboratories do integrate the full span of basic and applied research, and they develop the unique facilities required to support the DOE mission in ways that cannot take place in university campuses or private sector laboratories. The contractors for these laboratories must have the capacity to attract and lead the best scientific and engineering talent our Nation can muster.

Administrative systems at a laboratory cannot be developed independently of programmatic activities. Laboratory contractors may be partnerships, but the partnership must be structured as a single entity. Technical leadership is primary. Administrative excellence without technical excellence is useless to the Department mission.

Technical staff can and should be expected to incorporate high standards for protecting their safety, the environment, and other critical national assets, which is the knowledge they generate, as they carry out their daily technical work. To make this happen, laboratory leadership must be committed and the technical staff must be intimately involved. Self-assessments and reviews by the laboratories are critical, but should not be used against them as part of what I consider grandstanding oversight, in some cases.

Having said this, adding detailed clauses to contracts or competing laboratory contracts for the sake of competition will not achieve this kind of performance, and they will not prevent intentional individual ethical misdeeds. More reviews won't help. The history recounted in my testimony shows that the patterns of these reviews are pretty well established. There are basically two kinds of reviews. The first kind finds the laboratories to be technically outstanding, the crown jewels, critical to the Department's missions. They also find that DOE micro-manages the laboratories and adds unnecessary cost.

The second sort of review focuses on specific institutional or individual deficiencies that may have already been identified by the laboratories or DOE. These findings are then used to call into ques-

tion the contractors of the laboratories and the nature of the contracts. They also result in added oversight by the Department, which leads to accusations of micro-management and added costs.

The M&O contract concept used by the AEC and supported by the Joint Committee on Atomic Energy provided a framework that lasted 30 years. The last 25 years have seen continuous attacks on that framework. The House and Senate committees, which have the principal responsibility for scientific and technical program content, must work together to establish a new understanding of what the laboratories' M&O contracts should be, can be for the next 30 years. That is why I think the hearings that you are having today and in the next few months are critically important.

I believe, however, they should also be carried out in some way in a joint fashion with the other programmatic committees, like the Committee on Armed Services, like the Committee on Appropriations; although I know that on this side of the Hill appropriations and authorization overlap considerably. A report should be written. Hearings are simply not enough.

We need a written formulation of what your thinking is on this matter. If you could work with the corresponding House committees, it would be extraordinarily helpful. A clear statement from you and from the congressional sponsors, the programmatic sponsors, would allow the Department and the laboratories to move forward with some assurance of stability.

I know how hard it would be and will be to do this, but I also know that of all the committees that have authority over the Department and its laboratories, these are the committees which have the biggest commitment to seeing something happen with the Nation's investment in the Department.

Having arrived at such new understanding, I would urge you to then support the Department as it resists what will undoubtedly be continuing attempts to use the laboratories and their contracts to express opposition to the fundamental work of the Department, be it nuclear weapons or energy policy.

I have appreciated the opportunity to speak today.

[The prepared statement of Dr. Krebs follows:]

PREPARED STATEMENT OF DR. MARTHA KREBS, PRESIDENT, SCIENCE STRATEGIES,
LOS ANGELES, CA

Mr. Chairman, Members of the Committee, it is a great honor to appear before you and the Committee again. I appreciate the opportunity to discuss the relationships among the Congress, the Department of Energy, and the management of the National Laboratories. These hearings are important and as I congratulate the Committee as they begin, later I will encourage you to do more not only within the Senate but with your colleagues in the House. This testimony provides a brief description of my career and its intersection with the recent history of the Department of Energy. I then provide a similarly brief discussion of the relationship between the Laboratories and the AEC. With that as context, I summarize the many reviews of the DOE Laboratories that have addressed both technical performance and the character of the DOE's relationship with the Laboratories. I also review internal and external oversight of Laboratory business practices that resulted in criticism of the details and the long-term nature of the Laboratory contracts. Finally, I make some recommendations.

As you know, Mr. Chairman, most of my professional career has been involved with the Department of Energy, its science and energy programs, and its Laboratories. From 1977 to 1983, I served as staff member and Subcommittee Staff Director on the House Science Committee during the transition from the Energy Research and Development Administration (ERDA) to the cabinet Department of En-

ergy. The Laboratory missions and the Management and Operating Contract concept were reviewed three times in that period by the DOE Energy Research Advisory Board (ERAB), the President's Council of Science and Technology Advisors (Packard Panel), and the President's Private Sector Survey on Cost Control (The Grace Commission).

From 1983 to 1993, I was Associate Director for Planning and Development at the Lawrence Berkeley National Laboratory, operated for the DOE by the University of California. During that period, legislation was enacted that gave new authorities for technology transfer to the DOE laboratories; the Competition in Contracting Act also placed new expectations on Federal agencies for competitive procurements for goods and services. In addition, oversight by the House Committees on Energy and Commerce and Government Operations and the Senate Committee on Governmental Affairs focused on DOE and Laboratory management of procurement, security and environmental compliance. The Department initiated the broad reviews of environmental, health and safety performance at the Laboratories, known as the Tiger Teams. The Department created the Environmental Management program and raised its own questions about the need to reform the contracts for the Laboratories and the new clean-up sites. It also expanded the role of the ES&H Office from policy to detailed guidance and oversight.

From 1993 to 2000, I served as Director of the Office of Science, an Assistant Secretary level position. I had responsibility for the DOE's basic research programs and its 10 multi-program and single-purpose National Laboratories. During this time, the Department undertook a Contract Reform initiative, chartered the Secretary of Energy Advisory Board Review of the Laboratories (Galvin Committee), created the Laboratory Operations Board, and competed the contracts for the Brookhaven National Laboratory and the Oak Ridge National Laboratory. Throughout this whole time, the GAO has issued numerous reports, both specific and general, on the Department's management of the Laboratories.

I recount this intertwined history of my career and the Department of Energy not just to convey my experience, but also to show how the Department has grappled with the role of the Laboratories, their missions, their technical and business management and the extent to which the Laboratory contracts result in under- or over-management by the Department of Energy staff.

BACKGROUND: THE ATOMIC ENERGY COMMISSION

The National Laboratories began as part of the Manhattan Project; by the end of World War II, there were numerous universities and non-profit institutions intimately engaged in research and development for the Project. Soon after the establishment of the AEC in 1946, the General Manager, Carroll Wilson, convened an Advisory Board to recommend how the Commission should interact with contractors for research and development. (Ref. 1) It was recognized that the wartime urgency and command relationships of the Manhattan Engineering District would not be necessary or even desirable in peacetime. The Atomic Energy Act of 1946 provided new contracting authorities to permit the new agency flexibility.

The continuing need to engage the best scientific and engineering minds also argued for a different organizational structure that would attract the right people and provide an effective environment where scientifically driven work of vital national security interest could be carried out. Its recommendations focused predominantly on university and non-profit institutions. The Board also enumerated the motivations and risks that a university or non-profit would face in operating an AEC laboratory. In large measure they have not changed dramatically. Among the possible motivations were:

- (1) patriotic motives;
- (2) opportunities for enlargement of staff in certain fields of activity;
- (3) provision of additional research and educational facilities for staff and students;
- (4) underwriting of direct and indirect costs of research of such a character as to enhance the prestige of the institution.

Among the risks were:

- (1) need to use institutional funds as working capital;
- (2) need to assume financial risks to insure continuity of operation when contract renewals are delayed;
- (3) possible overexpansion of plant involving continued fixed charges after government contract work ceases.

Throughout the report of the Board, the Commission is urged to recognize that these contracts would procure management as well as goods and services. It noted

that Commission staff should not manage research but rather should determine high level program requirements and, in the field, oversee the fulfillment of the contract provisions. In large measure, the detailed scientific and engineering activities required to meet program requirements were left to Laboratory management. When questions arose as to contractual compliance, solutions should be developed in an interactive and mutual manner. It was expected that the private sector contractors were “financially and morally respectable” parties, which would not require the detailed and adversarial provisions and processes of traditional government contracts.

The Advisory Board addressed procurement in some detail. They noted that detailed records that would follow the evolution of components into larger research equipment and facilities would require tracking systems that would cost more than they were worth. They dealt with the need for much of the facilities to be government-owned, due to both programmatic and security considerations. As a result, the standard, university R&D contract would not suffice. It was expected that the contracts would be long term; the issue of competing specific Laboratory contracts was not raised.

Thus, it is clear that the general characteristics of the Management and Operating (M&O) Contract for the AEC Laboratories were laid out early in its existence. In the late 1940s and early 1950s, as the Department of Defense found itself in need of independent technical studies and analyses, it used the AEC M&O contract as a model for establishing institutions such as IDA, CNA and RAND. The Federal Acquisition Regulation for FFRDCs provides that “FFRDCs are operated, managed, and/or administered by either a university, consortium of universities, other not-for-profit or nonprofit organization, or industrial firm, as an autonomous organization or as an identifiable separate operating unit of a parent organization. Long-term relationships between the Government and FFRDCs are encouraged in order to provide the continuity that will attract high-quality personnel. This relationship should be of the type to encourage the FFRDC to maintain currency in its field(s) of expertise, maintain its objectivity and independence, preserve its familiarity with the needs of its sponsor(s) and provide a quick response capability.” (Ref. 4, App. B) Most of the DOE laboratories are FFRDCs. It is also worth noting that the DOD FFRDCs have been renewed without competition for the last half century.

Another notable characteristic of the AEC was its relationship with the Congress, as embodied in the Joint Committee on Atomic Energy. It was effectively the Commission’s Board of Directors; it focused on the performance of Commission programs by both Commission staff and the Laboratories. It authorized the Commission programs; it provided exemptions from many regulations in the ES&H arena; its Members sat with the Subcommittees on Energy and Water Appropriations, when the AEC budget was considered. In some respects, the Joint Committee protected the Commission and especially the Laboratories from the larger political forces that were being debated in the post World War II era. The disestablishment of the Joint Committee in 1977 and the creation of the Department of Energy later in 1977 opened the new Department as a whole to the oversight and legislative jurisdiction of more than 20 Congressional committees and subcommittees. In later sections, I will discuss the impact of this broadening of Congressional oversight and loss of institutional memory in wake of the abolition of the Joint Committee and the merger of disparate Federal agencies that became the Department of Energy. Let me now turn to more recent times.

TECHNICAL PERFORMANCE OF THE LABORATORIES—THE CROWN JEWELS

The early Department of Energy strove to organize itself to manage its complex mission of (1) energy policy, technology development and regulation; (2) development and production of an effective and safe nuclear deterrent; and (3) the advancement of the scientific foundations of fields critical to DOE and other national purposes. The role of the National Laboratories was in question in almost every area. Energy technology was to be used by the private sector but should federally funded laboratories be the source of that technology? There were also disagreements as to technological emphasis from one Administration to the next; this resulted in dramatic budget swings in DOE energy technology programs and at the Laboratories.

The role of the Laboratories was clear in nuclear weapons but increasingly controversial. They were a lightning rod for anti-nuclear weapons activists and the broadened Congressional jurisdiction provided a venue for investigation and debate. The public was also confused as to how many weapons labs there were. Every DOE Laboratory was seen as part of the weapons program. Even to this day, non-weapons laboratories struggle to distinguish themselves in the public view as basic science and/or energy technology institutions.

In the area of scientific foundations, the broader university community saw itself as a more efficient and creative competitor for Laboratory funds. Funding increases for NIH and NSF in the last decade have muted these latter concerns somewhat.

In the early Reagan Administration, three reviews mentioned earlier essentially identified the DOE Laboratories as extraordinary national scientific and technical resources, with special capabilities for the DOE mission. However, they called for better mission statements for the Laboratories. All three reports were concerned about the increasing “micromanagement” of the Laboratories by Department staff. It was clear that detailed management guidance had begun to proliferate even before DOE was created. The PCAST report, which reviewed what were then the more than 700 Federal laboratories, noted the strengths of the DOE M&O contracts and the NASA JPL contract. In particular, these contracts, permitted the Laboratories to attract and retain the nationally competitive staff in comparison to Federal laboratories tied to government pay scales. They recommended that other agencies look at using such contracts for R&D.

The ERAB and PCAST reports recommended that Laboratory Directors be given authority to use a limited amount of DOE program funds for independent research. DOE responded to the report and authorized what has come to be called Laboratory Directed R&D (LDRD). In the 1990s, LDRD became an interesting example of the lack of historical memory and coordination in the Congress. The House sought to terminate LDRD at the three weapons laboratories as a use of funds for unauthorized and inappropriate purposes. Fortunately the Senate did remember and this vital capability was preserved. However, the price paid is specific language in Laboratory contracts and a detailed annual prospective report. This could be called more “micromanagement” or, alternatively, a small price to pay.

By the beginning of the Clinton Administration, DOE’s mission had expanded to include clean-up of DOE sites. The end of the Cold War and the emerging Comprehensive Test Ban Treaty made the structure and content of the nuclear weapons program an issue and, of course, the character and number of the weapons laboratories was involved. On the science side, the Superconducting Super Collider (SSC) was in trouble and seen as only one of a number of Lab-based facilities that were over budget and behind schedule. And the energy programs were once again caught up in a change of emphasis—efficiency and renewables were seen as critical. As part of the National Performance Review examining Federal agency activities, the Department of Energy chartered a SEAB panel, chaired by Robert Galvin to look at the Labs once again. And once again the Laboratories were judged to be wonderful scientific institutions. It found that DOE requirements and processes were overly detailed, and that both the Department and the Laboratories could improve performance, if they would do benchmarking and adopt best practices from the private sector.

Another area of the Laboratories’ programmatic performance received less than sterling reviews during this period, i.e. project management. This came to a head early in the Clinton Administration in the wake of the termination of the SSC and increasing cost and schedule estimates of clean up projects at the Laboratories and former weapons production sites. Other lab-based technical projects subsequently had management problems as well. The General Accounting Office (GAO) produced several reports during this period about DOE project management problems. I personally took issue with them on several of their findings related to Office of Science projects. A National Research Council Committee was charged to review these issues and made suggestions with respect to both DOE and laboratory project planning, management and training.

The issue of project management was of special interest in the new Environmental Management Program. Once cleaned up, some of the former weapons production sites like Rocky Flats would no longer have a DOE program role. For such sites, the issue was raised about the character of the contract and the contractors needed to carry out the clean-up. In particular, what kind of capabilities were needed and what kind of incentives and disincentives were appropriate tools to include in these contracts? A dramatically different contractual instrument was envisioned. But at the Laboratories, where critical work would continue, the task was to merge a contract based on predictable outcomes for the clean-up program with the traditional M&O contract that had worked well for not easily predictable R&D activities. It was not an easy marriage to arrange and the concept of performance-based contracts arose with very specific, often quantitative, outcomes in project management and more qualitative expectations in R&D. This is still a work in progress.

In general, the Laboratories were seen as critical programmatic resources. Even in the case of problems with the management of technical projects, the role of the Laboratories was not questioned, and often DOE’s inappropriate, if not “micro”, management received more criticism than the Laboratories’ internal management.

After each of these reviews, the Laboratories and their program sponsors in DOE and in Congress were able to turn their attention once more to program performance.

But this is not the whole story. Through out the 1980's and 1990's, Congressional oversight subcommittees and GAO began to review Laboratory performance of administrative services. They stipulated the contractors' ability to manage R&D but raised questions as to their capability to manage routine administrative activities that are expected of any government contractor. The very character of the M&O contract, the preference to renew rather than compete, and its oversight by DOE was attacked.

PROCUREMENT, SECURITY, ENVIRONMENTAL, SAFETY AND HEALTH (ESH) ADMINISTRATION AT THE LABORATORIES

Business Practices Oversight—Part 1. In the mid 1980s, the House Energy and Commerce Committee held a series of hearings that examined certain procurement and security practices at the Lawrence Livermore National Laboratory. With the assistance of the GAO to examine internal DOE and Laboratory reviews, the Committee identified what they judged to be deficiencies or irregularities: high costs for bicycles used for getting around inside the one square mile Laboratory site, inability to locate high-value property at acceptable (better than 99%) rates within 24 hours; the management of a joint LLNL and FBI on-site drug sting, called "Snowstorm", and the performance of LLNL guards with respect to practice drills and security exercises at the Laboratory site. The Committee investigation required that DOE answer hundreds of detailed questions. The hearings called representatives from DOE headquarters, the field offices and the Laboratory for lengthy interrogations. All of these issues had been identified by the DOE and the Laboratory and involved judgment calls on the part of both as to how or whether to respond. The Committee disagreed with those judgments.

The Committee identified the non-adversarial, interactive relationship between DOE staff and Laboratory management as problematic and concluded that the M&O contract was one source that fostered such a situation. In addition, the Committee was troubled by the fact that DOE's M&O policy included a preference for renewal of the contract rather than competition. The burden was on the Department to demonstrate why competition was needed. In the light of the Competition in Contracting Act, this was seen as another unacceptable irregularity.

The fact that other agencies continued to make exceptions for both sole source procurements and uncompleted contract renewals was not addressed by the Committee. It is also the case that the Committee did not consider the impacts of its considerations on the nuclear weapons program activities at the Laboratory, because they were not under the Committee's jurisdiction. On the other hand, the House Committees on Armed Services and Appropriations with programmatic jurisdiction did not take on the Commerce Committee. The result was that the Department listened to the loudest complaints as a record was built portraying the M&O contract as an impediment to effective management of the DOE contractors.

Environmental Compliance at DOE Sites. At the same time, the new openness of the Department of Energy began to bring State and local attention to the hazardous chemical contamination at the DOE sites. The Congressional exemption of DOE from compliance with federal and state ES&H standards was still in force, but pressure was growing to clean up the sites. Some facilities had made budget requests to the Department for support. However, funding was not forthcoming; neither the Administration nor the Congress felt it was a priority. The Senate Committee on Governmental Affairs held several hearings on DOE environmental and contractor governance issues.

All of this changed in the Fall of 1989, when the FBI along with the EPA raided the Rocky Flats Weapons Production Facility. Eventually criminal charges were brought against contractor personnel. The DOE declared that it would abide by Federal, State and local laws. Congress later enacted legislation that required compliance with Federal environmental laws at DOE sites.

As part of DOE's response, comprehensive reviews (Tiger Teams) of ES&H management and compliance took place at every DOE contractor under extraordinarily rigorous schedules for both the reviews and corrective action implementation. The Teams consisted of DOE staff and consulting specialists who had limited understanding of the history of the specific sites. The Tiger Teams also took a comprehensive and formal view of ES&H management and looked into financial, procurement, property management and personnel activities at the site. Almost every site was judged to have substantial non-compliance problems. Many of these problems had to do with the paperwork required by Federal laws. Work rules did not deal system-

atically with waste disposal or materials storage. While contamination sites were often known, they were not characterized at a level that would comply with Federal regulations. Insufficient remediation activities were underway. The public was alarmed.

Given the Congressional exemption from Federal environmental regulation, this state of affairs should not have been a surprise. What was surprising at least from the Laboratory perspective, was that both the Department and the Congress forgot that they had had a role in creating the problem. What had been "our" problem became solely the Laboratories' problems and their fault.

There is no question that it was long overdue for the Laboratories and DOE to be accountable for environmental compliance. The Laboratories learned a lot by bringing their activities and management procedures up to date. It was sudden and it was grueling at every level of the Laboratories.

Implications for Contract Management. But as DOE Headquarters moved forward, they wanted changes in the contractor relationship and the contract. From their point of view, the trust and mutuality implicit in the M&O contract was no longer functional. Until this time, the Laboratory leadership had seen themselves as the "contractor" and so did their superiors in the parent organizations. The Department senior management wanted separate accountability from the "contractor" as opposed to the "Laboratory." As a result, many contractors, and certainly the University of California, built a whole new organizational structure between itself and its Laboratories and its senior leadership. The comprehensive view of management for environmental compliance also brought a whole new set of reviews and expectations for what came to be called the business functions of the Laboratories. The new contractor organizations were given responsibility for assuring these functions as well. And it was also the case that the ES&H Office in DOE grew dramatically and broadened its focus from policy to include inspection and compliance.

Another concept of Laboratory management was also broached at this time, which was that technical leadership and business management were different skills not to be expected from the same individuals or organizations. The notion, called the "hospital model", went something like this: Doctors practice medicine; they don't manage hospitals; administrators do. According to the model, new kinds of contractors would be required for Laboratories as well as the clean-up sites. Thus, the preference for M&O contract renewal was also broken. The Laboratories made the argument that business practices managed in a disconnected way from the technical, programmatic work of the Laboratories would not gain the respect or commitment of the researchers. The business practices used by the Laboratory are a critical element of the overall environment, which enabled the scientific work to get done. Lab morale and recruitment would suffer if the technical and business leadership were not seamless. This particular discussion went no further, but for the first time, serious questions were raised inside DOE about competition.

By the time the Clinton Administration took office, multiple layers of reviews were occurring at the labs carried out by DOE programs, by the ES&H Office, by the DOE field organizations, State and local regulators, contractor central organizations and by the Laboratories themselves. Costs for the DOE Environmental Management Office were skyrocketing. Confidence in field offices and the clean up site contractors were at a low ebb. The Integrated Safety Management approach, as developed and applied at the Laboratories and included in revised contracts, helped to reduce the burden of repetitive and costly inspections.

The Contract Reform Initiative was intended to codify the changed relationship with the Department's contractors. In its early stages, it addressed the changed needs at the clean-up sites. There was a conviction that these sites could be managed as a set of small and large projects by a contractor incentivized by a structured fee that would motivate timely and compliant completion of the projects. This fee would be sufficient to motivate the contractor to put their own assets at risk as they do for certain other government contracts. The need for a long-term relationship with these contractors was not a high priority. Competition for renewal was expected.

While the Laboratories were recognized as different and that a long-term relationship was desired, the preference for renewal was replaced with a preference for competition. This is a good example of the "one size fits all" mentality that is pervasive at the Department. The expectation that the contractors could be economically motivated to put their own assets at risk for a high enough fee was never fully put to rest in the minds of DOE procurement officials. They never quite understood that universities and non-profit contractors had either very little or no assets to risk or little direct control over the assets that they did have. They also did not understand that the fees were essentially overhead on the appropriated research programs, which would hurt research progress when higher fees were assessed. The Labora-

tory contractor thus would be in a very hard place between the DOE research program and their own scientists, if they negotiated for higher fees. But the policy still reflects this misunderstanding. It is also further perpetuated in the recent Laboratory Operations Board Review of the proposed Best Practices Pilot, where some members of the review panel believed that a financial incentive was stronger than contract term extension. (Ref. 7)

Business Practices Oversight—Part 2. The Wen Ho Lee case in the late 1990s raised many of these concerns again but in the context of security. In some respects, security violations, especially at DOE weapons laboratories, are more than a failure of business practices. The critical generators of information that must be held secure are the scientists and engineers themselves. But like environmental management, good security management means an integrated approach to all areas of the Laboratory's business—procurement, finance, human resources, property management—as well as technical programs. Thus it is understandable that failures in these systems may and should mean more at a weapons laboratory than at other DOE sites. Consider the recent P-card misuses, which precipitated the recent decisions about the LANL contract. P-cards were introduced, because they had been identified as a cost-saving best business practice, and DOE had approved of the implementation. Further, the abuses were identified through a regularly scheduled internal review by the Lab and DOE. This is how a “management system” is supposed to work.

The fundamental lesson here is clear: contracts and integrated management systems cannot protect an institution—DOE, Los Alamos, or the University of California—against the intentional, unethical behavior of individuals. While the decision to compete the Los Alamos contract may be irreversible and well founded, much of the rhetoric betrays a view that a competition will get an intrinsically better deal for the Department and from the University of California, if it chooses to compete. The encouragement of the University to compete with possible partners with demonstrated management skills suggests that the “hospital” model is still alive and well in the Department. It betrays a fundamental misunderstanding of what it takes to provide and manage an environment where creative science can happen.

CONCLUSIONS

When I served at the Department of Energy and had the occasion to testify before Congress, I always focused on the positive, because the Department's mission was important and its Laboratories had made so many significant contributions to that mission and were needed in the future. None of that has changed.

I have tried to describe the evolution of the Department and its Laboratories in an objective manner. As I come to conclusions, I can no longer do that. I care too much. Today I have dwelled on the difficulties that have faced the DOE and its Laboratories. I do not excuse the Laboratories' deficiencies, some of which I certainly know to be real. I have also shaken my head at what I have seen as occasional misjudgments by Laboratory and contractor leadership. I do not oppose recompetition of Laboratory contracts categorically. However, I also believe that since the creation of the Department, there has been well-meaning, often unintentional, but ultimately malign neglect on the part of the internal and external programmatic sponsors of the Laboratories. The oversight and ‘management’ elements of the Department and of the Congress, which are not responsible for delivering the Department's mission, have not been effectively countered by program sponsors. Other agencies suffer embarrassments for their ineffectiveness, but they are rarely browbeaten. They are not expected to change their procurement policies, and their contractors are rarely removed despite overruns, schedule slips and occasionally ethical lapses.

Although much criticized, the Department has a real and important mission. It is complicated but it has four clear elements: energy, nuclear weapons stockpile, environmental management and science. There may be questions about the policies that underlie this mission. Disagreements about nuclear weapons policy or energy policy do not mean that the Department does not have a mission. And the Department is not solely responsible for brokering agreements on policy. Both the Executive branch and the Congress have often been unable to do their parts in developing proactive policies and have used deficiencies in the Department as an excuse to avoid the effort. The content and competition of the Management & Operating contracts for the Laboratories have become one of the hobbyhorses that critics have ridden.

Changes in policy or its interpretation may change programmatic content, but each of the mission elements will need R&D to achieve its goals. The DOE Laboratories do integrate the full span of basic and applied research and they develop the unique facilities required to support the mission in ways that cannot take place on university campuses or private sector laboratories.

The contractors for these Laboratories must have the capacity to attract and lead the best scientific and engineering talent our Nation can muster. Administrative systems at a Laboratory cannot be developed independently of programmatic activities. Laboratory contractors may be partnerships, but the partnership must be structured as a single entity. Technical leadership is primary; administrative excellence without technical excellence is useless to the Department mission. Technical staff can and should be expected to incorporate high standards for protecting their safety, the environment and other critical national assets as they carry out their daily technical work. To make this happen, Laboratory leadership must be committed and the technical staff must be involved in identifying how individual actions in research facilities can be carried out to meet these standards. Self assessments and reviews by the Laboratories are critical but should not be used against them as part of grandstanding oversight. Having said this, adding detailed clauses to contracts or competing Laboratory contracts for the sake of competition will not achieve this kind of performance.

More reviews won't help. The history recounted above shows that the patterns of these reviews are established. There are basically two kinds of reviews. The first type finds the Laboratories to be technically outstanding crown jewels critical to the Department's mission. They also often find that DOE micro-manages the Laboratories. The second sort of review focuses on specific institutional or individual deficiencies, that may have already been identified by the Laboratories or DOE. These findings are then used to call into question the contractors of the Laboratories and the nature of the contracts.

The M&O contract concept used by the AEC and supported by the Joint Committee provided a framework that lasted thirty years. The last 25 years have seen continuous attacks on that framework. The House and Senate Committees, which have the principle responsibility for scientific and technical program content, must work together to establish a new understanding of what the Laboratories' M&O contract should be for the next thirty years. The Joint Committee should not and cannot be reestablished, but the Senate Committees and the staff of Energy and Natural Resources and Armed Services and Appropriations should hold joint hearings on this topic. A report should be written; hearings alone are not enough. We need a record of Congressional thinking on this matter. This should be done in cooperation and consultation with the House Committees on Science, Armed Services and Appropriations. You may decide that you want a strict preference for competition and a more standard 'goods and services' contract. I do not believe that is the right position, but a clear statement from this group of sponsors will allow the Department and the Laboratories to move forward with some assurance of stability.

I know how hard it would be to do this but I also know that of all the Committees that have authority over the Department and its Laboratories, these are the Committees which have the biggest commitment to seeing something happen with the Nation's investment in the Department. Having arrived at such an understanding, I urge these Committees to support the Department as it resists what will undoubtedly be continuing attempts to use the Laboratories and their contracts to express opposition to the fundamental work of the Department, be it nuclear weapons or energy policy.

I have appreciated the opportunity to speak with you today. The conclusions from these hearings can set the tone for this Administration and future Administrations at the Department as to how they use and exercise their stewardship for the remarkable set of institutions that are the National Laboratories. Thank you.

References:

The chronology of events in this document relies strongly on my personal memories of events referenced here. A true history would require considerably more research into the records of the Congress and the Department. The references listed below are also not comprehensive, but are useful but not always widely known documents that have or are now shaping the DOE-Laboratory relationships.

1. Report of the Advisory Board on Relationships of the Atomic Energy Commission with its Contractors. First Revision. June 30, 1947. J.W. Hinkley et al.
2. James T. Ramey and John A. Erlewine. Introduction to the Concept of the "Administrative Contract" in Government Sponsored Research and Development. 17 The Federal Bar Journal 354 (1957), p.371.
3. O.S. Hiestand, Jr. and Mark J. Florsheim. The AEC Management Contract Concept. 29 Federal Bar Journal 67 (1969), p.68.
4. At the Crossroads, A National Laboratory Staff Paper on the M&O Relationship. June 28, 1993.

5. "Department of Energy: Clear Missions and More Effective DOE Management Can Enhance the Value of the National Laboratories." (GAO/RCED-95-10).

6. DOE Best Practices Pilot Study. (February 2002)

7. Need for and Barriers to the Adoption of the 'DOE Best Practices Pilot'. DOE Laboratory Operations Board. April 16, 2002.

8. NNSA Model for Improving Management and Performance. Albuquerque Operations Office. May 2002.

The CHAIRMAN. Thank you very much.
Dr. Hecker.

**STATEMENT OF SIGFRIED S. HECKER, SENIOR FELLOW,
LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NM**

Dr. HECKER. Thank you, Senator Domenici, Senator Bingaman, Senator Craig. It is a pleasure to be here this morning to share my thoughts.

I would like to make three points. The first is the GOCO system of governance that you have discussed, Senator Domenici, for the DOE nuclear weapons labs was based on a partnership between the Government to deal with what I call the inherently governmental nature of the development, construction, and the life cycle support of nuclear weapons. So I will address principally my views of GOCO from the defense laboratories' standpoint.

This partnership was designed to steer between the alternatives of a completely Federal operation on one hand and a procurement-oriented contract operation on the other. I maintain that this GOCO partnership was deliberate, it was innovative, and it was successful. Not only did these defense laboratories provide the cradle-to-grave care for nuclear weapons, of course helped to end World War II, helped to resolve the Cold War in our favor, but we have also contributed to other critical national security missions. I think that system of governance is just as important today as it was over the past 60 years.

The second point I want to make is that over the years as the missions have evolved and as the public expectations of the nuclear enterprises have changed, and the public expectations of the laboratories have changed, and the nuclear enterprise expectations particularly changed as a result of Three Mile Island and the Chernobyl accidents, that both the Department of Energy and the laboratories were often slow to make the necessary changes.

However, rather than working together in the spirit of this partnership to make the necessary changes, the Department of Energy typically responded to public criticism and to intense congressional pressure with new orders, more rules, and contract terms that fundamentally shifted this governance away from a partnership and towards what I would call a hybrid Federal operation or procurement operation, perhaps adopting the worst of both.

The lines of responsibilities have then become blurred between the Department of Energy and the laboratory, with more and more of the operational decisions actually being made by Federal employees, but more of the accountability and the liability being shifted to the contractors.

Consequently, it has become increasingly difficult for the contractors to take the public service approach that is absolutely necessary to do this inherently governmental mission. It has also become

more difficult to nurture world class science, to deal with the risks of nuclear operations, and to provide a buffer from the political pressures, as well as to provide the continuity that is necessary for stewardship.

These changes were not made by design, with the best governance in mind, but, rather, resulted from the accumulated reactions of the Department of Energy to various governmental audits, and, as I have mentioned, congressional pressures. The net result is a significantly diminished ability of the laboratories to accomplish their mission and to dramatically reduce the productivity of the laboratories. In other words, the current system of governance as it has evolved I would maintain is neither deliberate, innovative, nor successful.

The third point: these problems must be repaired before the damage to the entire system becomes irreparable. Although the contractors must be held to the highest standards in managing all of the operations, the solution to the current crisis is not as simple as just competing or changing contractors. If the some of governance of is broken, as I maintain it is, then no contractor will be able to accomplish the mission successfully and productively. To achieve world-class performance, you not only need a world-class contractor but you need a world-class customer, and you need a revitalized system of governance. Such a system must be established, a partnership between the government and the contractor.

By the way, that is a word that is never used in a positive sense in any of the GAO audits that I have ever read. We must rebuild the trust. Again, trust is viewed as an offense, rather than being something inherently necessary in the system when you read these audits. They must increase flexibility and value this public service orientation of the contractor. In fact, the changes that have been made over the past few years if anything seemed to go counter to valuing a public and private sector partnership and those institutions that have a long record and history of public service.

Mr. Chairman, members of the committee, I go into much greater detail in my written statement. Particularly I try to convince you there that these are not just abstract thoughts about this, but they come first of all from the heart, and they come from having had a front row seat in this business for 38 years. I first came to Los Alamos, in fact, this week 38 years ago. I was there as a student, as a scientist, as a manager, as a director, and now back as a scientist. I went back as a scientist because I felt it was so important that, once we develop nuclear weapon stewardship, that we can actually make it successful.

Unfortunately, what I have found is no longer the type of attractive environment that brought me to Los Alamos. Quite frankly, I came there not to design bombs, not to build bombs; I came there because it had the "University of California" label in front. I was going to be a university professor. It created an environment that was the best research environment in the world. It brought me back to Los Alamos two other times because of that research environment. Only with the course of time did I get the sense of the importance and the challenge of the nuclear weapons mission, so in essence I was co-opted into that. I have done that now for a total of 38 years.

But now, we no longer have that same supportive research environment: the trust, the flexibility, the sense of partnership. I don't see it. I hate to say this, but the environment is no longer as conducive for the next generation of scientists to start at Los Alamos the way I did some years ago.

These are not just my own thoughts. You have heard reference made to various other commissions, the Galvin task force, and more recently the Hamre Commission on Science and Security. If you look through, they will use the words "partnership," "trust," "system of governance is broken."

Mr. Chairman, I am very encouraged by the fact that you are holding this series of hearings. It is especially important today, because interestingly, thanks to your efforts and those of your colleagues today, we at the weapons laboratories have important missions. We actually have adequate budgets. For the first time in a long time, we are replacing the aging facilities and infrastructure.

All of those things are very ready to go, but we have undermined the environment by letting this partnership dissolve. I hope we can fix that. I agree with Martha's comments that something needs to be done. The importance of Congress and the committees cannot be overstated. My recommendation is actually for a congressionally-appointed blue ribbon task force to design a system of governance, 60 years from when it was first designed, in order that we can meet the government missions.

In the end, if we cannot attract the best of the people to the laboratories to do the job for the country, nothing else matters much. Thank you.

[The prepared statement of Dr. Hecker follows:]

PREPARED STATEMENT OF SIGFRIED S. HECKER, SENIOR FELLOW, LOS ALAMOS
NATIONAL LABORATORY, LOS ALAMOS, NM

Mr. Chairman, I am pleased to be invited to share my views on a subject that is of great concern to me. I have prepared this written statement. With your permission, I would like to enter it into the record along with a comprehensive article I wrote on this subject in 1997. I will briefly summarize my statement this morning. Specifically, I want to make three points.

First, the GOCO (government owned, contractor operated) system of governance for the Department of Energy nuclear weapons laboratories was based on a partnership between the government and a contractor to deal with the inherently governmental nature of the development, construction, and life-cycle support of nuclear weapons. The partnership was designed to steer between the alternatives of a completely federal operation and a procurement-oriented, contract operation. The GOCO partnership was deliberate, innovative and successful. Not only did the weapons laboratories provide the cradle-to-grave care of the nuclear weapons that helped end World War II and deter the Soviet Union during the Cold War, but they also contributed to other critical national security and civilian missions. The need for a successful system of governance for these laboratories is as great as ever in light of the challenges of stockpile stewardship in a no-test environment and of the increased threats of proliferation of weapons of mass destruction and terrorism.

Second, over the years, as missions evolved and as public expectations of these institutions changed, the laboratories were often slow to make the necessary changes. However, rather than working with the laboratories to institute the necessary changes in the spirit of the GOCO partnership, the DOE typically responded to public criticism and congressional pressure with new orders, rules, and contract terms that fundamentally shifted governance away from the GOCO partnership toward a hybrid federal operation and procurement contract operation. The lines of responsibility and authority between the DOE and the contractors have become blurred, with more and more of the operational decisions made by federal employees, but more accountability and liability shifted to the contractors. Consequently, it has become increasingly difficult for contractors to take the public-service ap-

proach required for nuclear weapons stewardship, to nurture world-class science, to deal with the risk of nuclear operations, to provide a buffer from political pressures, and to provide the continuity necessary for stewardship. These changes were made not by design with the best governance in mind, but rather resulted from the accumulated reactions of the DOE to government audits and congressional pressure. The net result has been to significantly diminish the ability of the laboratories to accomplish their missions and to dramatically reduce productivity.

Third, these problems must be repaired before the damage to the entire system becomes irreparable. Although contractors must be held to the highest standards in managing all of their operations, the solution to the current crisis is not as simple as changing contractors. If the system of governance is broken, as I contend it is, then no contractor will be able to accomplish its mission successfully and productively. To achieve world-class performance we must have not only a world-class contractor, but also a world-class customer and a revitalized system of governance. Such a system must re-establish the partnership between the government and the contractor, it must rebuild trust, flexibility, and a public-service orientation, and it must opt for contract terms that encourage implementation of best practices from the private sector rather than adopting prescriptive federal practices. These changes will be difficult to implement now that the system has swung so far from these features. I believe that a congressionally mandated Blue Ribbon Task Force chartered to design an improved system of governance is the best way to address this important and urgent problem.

THE GOCO (GOVERNMENT-OWNED, CONTRACTOR-OPERATED) PARTNERSHIP FOR THE NUCLEAR WEAPONS PROGRAM

I will first discuss the salient features of the GOCO partnership that formed the basis of governance of the DOE laboratories. Although many of these features applied to both weapons and civilian laboratories, I will focus my remarks on the nuclear weapons laboratories.

The development, construction, and life-cycle support of the nuclear weapons required during the Cold War were inherently governmental functions.¹ However, the government realized that it could not enlist the necessary talent to do the job with its own civil-service employees. Instead, it enlisted contractors to perform the government's work on government land, in government facilities, using the specialized procurement vehicle of an M&O (management and operations) contract.

The government does not normally contract out inherently governmental functions such as managing the armed services, conducting international relations, or the printing of money. But when it does, there is sufficient authority (notably the Atomic Energy Act in the case of nuclear weapons) to tailor the resulting contracts in a way that addresses the special concerns of both the government and the contractor. The government used the M&O contracting vehicle to develop the GOCO partnership for atomic energy activities.

The GOCO partnership was deliberate, innovative and successful. Not only did the weapons laboratories provide the cradle-to-grave care of the nuclear weapons that helped end World War II and deter the Soviet Union during the Cold War, but they also became world-class research institutions that positively impacted the broader interests of the United States. The GOCO concept was designed as a partnership to steer between the alternatives of a completely federal operation and a procurement-oriented, contract operation.

Specifically, for the nuclear weapons laboratories the contractor was chosen to bring to the job scientific and management talents that typically do not exist in the federal government. Furthermore, the contractor was not to be saddled with all federal rules and regulations governing procurement, personnel policies, etc., in order to be quicker, more flexible, and more effective than the government itself.

Under the GOCO partnership, the government defines general policy and programmatic goals. The contractor is responsible for performing the research programs in a technically sound, cost-effective and safe manner. In simple terms, the government decides what's to be done, and the contractor decides how and by whom. The government, as owner and customer, had the responsibility of holding the contractor accountable for its performance, for safe and secure operations, and environmental stewardship of the government's facilities.

¹ "Inherently governmental function" means, as a matter of policy, a function that is so intimately related to the public interest as to mandate performance by government employees. This definition is a policy determination, not a legal determination. An inherently governmental function includes activities that require either the exercise of discretion in applying government authority, or the making of value judgments in making decisions for the government. (Quoted from the Federal Acquisition Regulations [FAR], Part 7.5).

The nuclear weapons program required the following characteristics:

- Long-term commitment, but limited access (the government did not want dozens of institutions involved in the design and development of nuclear weapons).
- Technical excellence and innovation in a highly classified environment.
- Ability to cope with potentially enormous risks and hazards.
- Unwavering technical integrity.
- Unique, expensive facilities.
- Cost-effective, safe, and environmentally responsible operations.

These requirements were met by appealing to organizations such as the University of California and AT&T Bell Labs (two of the most respected and innovative research institutions in the world) to join the government in a public-service partnership.

The *sine qua non* of the University of California's agreement to serve the nation was "no gain, no loss," while providing outstanding public service. The government's interest in accomplishing high-risk research at minimum cost was served by the University's commitment to public service with no profit or fee. The University's concern with financial risks and liabilities was alleviated by the government's commitment to broad indemnification. The laboratories performed large-scale, complex research and development activities that were essential to the mission, but by their very nature carried great inherent risks. The only reasonable condition under which the University could serve was with federal indemnification. The University's service was rendered solely for the advancement of the national interest, without personal or institutional gain.

Under this arrangement, the University did the work, and the government covered the cost and took the major financial risks. While the government's indemnification of the University was never absolute, the basic approach was that the government would bear the risks to essentially the same extent as if the government were performing the work itself, while appropriately holding the contractor accountable for stewardship of government resources.

CHANGES OF THE GOCO RELATIONSHIP OVER TIME—A PERSONAL VIEW

Mr. Chairman, in your letter of invitation you asked me to address how changes in federal governance of the laboratories over the years have impacted the ability of laboratory scientists to respond to national missions. I had a front-row seat for 38 of the 60 years of the existence of the laboratory system first as a student, then a scientist, then a manager and laboratory director, and now, again, as a scientist. So, I will take the liberty of providing a brief journey through my career at the Los Alamos National Laboratory as a way to answer your question and touch upon some of the broader issues you raised.

Nirvana

I first came to Los Alamos in the summer of 1965 as a 21-year old student in search of adventure and scientific challenge. Within a week, I was working productively in a plutonium lab under the guidance of a hands-on mentor in the most modern plutonium facility in the world, the Chemistry Metallurgy Research (CMR) Building. I had a productive and fascinating summer that greatly influenced the rest of my life.

Looking back now, what happened that summer was astonishing. First, I received a security clearance to work "inside the fence" within three months—in spite of the fact that I was born in Poland, grew up in Austria, had been in the United States less than 10 years, and a citizen less than five years. The necessary background checks were done expeditiously to allow me to start at the laboratory that summer. The clear message was that my new country trusted me and for me that trust became the most demanding gift of all. During the past 10 years, the clearance process for American-born applicants has typically taken one to two years (because of a variety of bureaucratic impediments, not because the background checks are more thorough)—a period that seems like an eternity, especially for young people eager to get to work. Moreover, as I will demonstrate below, the sense of trust, so essential to the conduct of our national security mission, has been seriously eroded over the years.

Also, having a 21-year old with no nuclear materials experience working in a plutonium lab within one week is not only unheard of today, but the federal authorities would most likely consider it irresponsible management practice. Yet, I believe that I received an excellent, professional, and safe indoctrination because I was mentored by experienced scientists and engineers, not guided by a thousand-page rulebook. I was taught that safety is an integral part of the fabric of work, not something that

is added on because of compliance with rules and regulations. Safety was our responsibility and every employee knew that. However, as I will explain below, environmental, safety, and health issues became major issues in the DOE complex and the laboratories around 1990. The DOE response was very compliance driven and the increased presence of DOE overseers and auditors blurred lines of responsibility instead of improving safety. The laboratories, on the other hand, were slow to adapt to changing requirements and public expectations. Over a period of a few years, they began to adopt best practices from the private sector through an integrated safety management approach. However, this was very difficult under an overly prescriptive federal environment.

After returning to school to complete my graduate work, I returned to Los Alamos three years later as a postdoctoral research fellow and what I considered a stop on the way to a university professorship. Los Alamos offered one of the most attractive research environments in the country and it belonged to the prestigious University of California family of campuses and labs. Los Alamos had excellent research facilities, a broad spectrum of great scientists and engineers, and great financial support. Moreover, the laboratory had the flexibility to permit me to follow my research interests. These were times when the spirit of partnership permeated every aspect of the laboratory's operations. It was a time when the Congress (through the Joint Committee on Atomic Energy), the executive branch (through the Atomic Energy Commission), and the contractor (the University of California, for our laboratory) were true partners in the nation's nuclear enterprise. Subsequent to my two-year appointment, I decided to make a stop in an industrial research laboratory at General Motors before moving on to a university. However, I never reached my destination because my Los Alamos colleagues were sufficiently persuasive to convince me to return instead to Los Alamos as a technical staff member in 1973.

My goal was to do materials research, not weapons research and development. I did not go to school to design or build bombs. I never imagined that I would get deeply involved in nuclear materials and nuclear weapons. Yet, the environment created by the University of California at Los Alamos hooked me to this very day. It gave me the opportunity to do world-class research and it allowed me to serve my country at the same time. I learned how scientifically fascinating the nuclear weapons problems were. It allowed me to learn from Nobel laureates and Manhattan Project pioneers. It was an atmosphere that awakened a sense of patriotism and public service. I was proud to be contributing to the compelling missions of the laboratory—fundamentally, that of national security, but also contributing to energy, environment, and public health. Partnership, flexibility, and trust were still central. The bureaucracy at that time was much less and seemed bearable; although the old timers complained that things were not the way they used to be.

Winds of Change

During the late 1970s and early 1980s, things began to change. The broadened missions of the laboratories that followed the transformation in 1977 of the Atomic Energy Commission to the Department of Energy (via the short-lived Energy Research and Development Administration) brought with them significantly more government bureaucracy. The new department was clearly a political entity, not the focused, professionally staffed AEC. Moreover, the elimination of the Joint Committee on Atomic Energy in Congress decreased the support for nuclear activities in Congress and added much bureaucracy because of complicated jurisdictional issues.

During the 1980s, things also changed for me. I took on increasingly greater management responsibility along with my research. I was fortunate to be asked to lead the laboratory, beginning in January 1986 and to serve as its director, which I did until November 1997. In spite of the changes noted above, the spirit of the GOCO partnership between the Department of Energy and the laboratories still existed. The laboratories were still part of the DOE family. The DOE leadership set overall policies and directions, provided oversight, and held us accountable. We, the laboratories, had cradle-to-grave technical responsibility for the nation's nuclear weapons. We provided continuity from one government administration to the next. For example, my tenure as director overlapped that of four Secretaries of Energy. This relationship was enabled by the special nature of the GOCO partnership contract. The laboratory directors had the responsibility for the safety, security, and reliability of nuclear weapons. The President's confidence in the nuclear arsenal was based to a large extent on the judgment of the directors. Clearly, the directors had to act in the best interest of the nation. I was able to do so because the University of California had a long history of public service and it was protected by a special contract with the government that covered major liabilities.

The partnership between the DOE and the laboratories also manifested itself in a number of exciting initiatives to respond to changing missions during the late

1980s. As the Soviet Union began to disintegrate, we jointly launched initiatives that addressed other critical national problems that could benefit from the capabilities of the laboratories. These projects included addressing non-proliferation concerns, improved conventional munitions, ballistic missile defense, enhanced energy supply, the development of high-temperature superconductors, the Human Genome Project, and industrial partnerships with industries such as the oil and gas industry. These projects were partnerships between DOE and the laboratories and had strong backing from Congress, especially from Senators Domenici and Bingaman.

The DOE Complex Under Stress and a Retreat From the GOCO Partnership

But the late 1980s witnessed not only the disintegration of the Soviet Union, but also the slow but steady disintegration of the DOE nuclear complex. In Washington, there was a loss of a sense of urgency for the nuclear weapons mission. In addition, the growing national environmental awareness brought into question many past practices in the nuclear weapons complex. The public expected greater scrutiny of the nuclear complex and better stewardship of the nuclear enterprises, especially following the Three Mile Island accident in 1979 and the Chernobyl reactor disaster in 1986. The DOE complex experienced particularly intense public and congressional scrutiny following a 1984 federal court decision on an environmental lawsuit regarding the Oak Ridge site that ordered all DOE facilities to be placed under federal, state, and local environmental regulations instead of being self-regulated. The resulting changes in operations in the DOE complex greatly impacted the productivity of the complex and changed the relationship between the DOE and its contractors. Many of the production facilities in the nuclear weapons and materials complex were shut down, some in keeping with changing mission requirements (such as the plutonium production reactors and uranium enrichment facilities) and others principally because of regulatory concerns (pit production at Rocky Flats, for example).

It was not the stricter governmental safety and environmental regulations per se, but the way DOE responded to these regulations that led to these problems. Driven by intense public and congressional pressures, the DOE responded with increased oversight and prescriptive remedies that focused on compliance and paperwork, rather than improved safety and better environmental practices. The increased scrutiny began in the weapons production complex, but moved to the laboratories around 1990 with the implementation of the DOE Tiger Team inspections. The DOE increasingly prescribed how the work by the contractors in the complex should be performed, rather than specifying what was to be done and then holding contractors accountable for doing it safely and effectively. The Department and other agencies increased the number of audits dramatically (for example, at the Los Alamos National Laboratory we had roughly 160 audits in 1992) and put more and more of its federal employees on site to oversee operations. The roles, responsibilities, and authorities of federal overseers and contractor personnel became confused, often leading to an adversarial relationship.

The DOE Tiger Team inspections were symptomatic of the change attention focused on regulatory compliance that was mostly process and paperwork oriented instead of outcome driven. These changes led to a great proliferation of DOE employees in the audit chain at the laboratories. The laboratories responded by staffing up their own auditing staffs and functions, even creating new internal organizations to respond to the requirements imposed by the DOE. In addition, the laboratories were trying to balance programmatic requirements with newly imposed environmental, safety, and health requirements without adequate financial support from the government. Moreover, they were trying to make all these changes in facilities and infrastructures that were old and often beyond repair. For example, the CMR Building in which I began my career was nearing the end of its useful life, yet we were not able to get DOE approval for a replacement facility at this time.

Consequently, much of the trust that formed the basis of the GOCO relationship between the DOE and the contractor was lost. The Department's relationship with the laboratories, driven to a large extent by pressure from Congress, changed from one of owner/operator to policeman/operator. The relationship changed from one of partnership to an arms-length government procurement. Congress insisted on greater "accountability" from the Department and its contractors, but it too often measured success by how well the Department or the contractors fared during government audits, rather than by how well they accomplished their missions. Virtually every audit by the Government Accounting Office (GAO) of the DOE complex concluded that the "insufficient DOE oversight" was a major contributing factor to whatever problems were cited.

It was no surprise then that with each contract renewal, the DOE further dismantled the GOCO partnership to make the contracts more like standard government procurements. The Department began to take away many of the special procure-

ment practices built into the GOCO contracts that allowed flexibility and speed. Yet, it was these special contractual provisions that allowed the laboratories to emulate private sector practice, rather than cumbersome federal procurement regulations. It began to impose federal personnel policies and business practices on the contractors. It began to chip away at the indemnification provisions offered to GOCO contractors since the inception of the concept. It began to shift the risks of operations of its nuclear facilities increasingly to the contractors, offering financial incentives to those who were willing to compete in this new contractual environment. Consequently, the DOE either lost or fired many of the stellar American companies that agreed to step in after the Manhattan Project to help create and manage the nuclear complex. In the early 1990s, AT&T, which had operated Sandia National Laboratories since its inception, declined to consider continuation of its management role when the DOE decided not to renew its presidential indemnification (first approved by President Truman) for operation of the Sandia laboratories. Lost to the DOE complex for a variety of reasons were such stellar companies as DuPont, General Electric, Dow, Union Carbide, and Rockwell. These changes may have made it easier to audit the laboratories, but they did not make them more effective. In fact, these changes very negatively affected the operational environment. It also made it more difficult to recruit the best scientists and engineers, and it discouraged qualified individuals from taking on scientific leadership/management positions. Over time, it diminished the laboratories' ability to accomplish their technical missions effectively.

These problems were noted by the Galvin Task Force, which reviewed the governance of the DOE laboratories and issued its report on *Alternative Futures for the Department of Energy Laboratories* in February 1995. The Task Force lamented the fact that the GOCO relationship between the DOE and the contractors had deteriorated to the point where the laboratories look essentially like GOGO (government-owned, government-operated) institutions. The report states: ". . . wherever we turn we see evidence of nothing but a government owned and more government operated system." The report pointed out that both DOE and Congress must shoulder the responsibility for this erosion. The Task Force further observed: ". . . the Department is driven both to honor the prescriptions from Congress and to over-prescribe in order not to be at risk of failing to be super attentive to the Congress's intentions. The net effect is that thousands of people are engaged on the government payroll to oversee and prescribe tens of thousands of how-to functions. The laboratories must staff up or reallocate the resources of its people to be responsive to such a myriad of directives; more and more of the science intended resources are having to be redirected to the phenomenon of accountability versus producing science and technology benefits." The Task Force indicated that productivity at the DOE laboratories could be enhanced by 20 to 50 percent. It concluded that the system of governance was broken, having veered significantly from its GOCO practices.

At this point, most of the contractors and their laboratories looked to the private sector to attempt to re-engineer the laboratories. We at Los Alamos began a "productivity initiative" in the early 1990s to apply the lessons learned by the private sector in the 1980s to make our operations more productive while ensuring safety and environmental responsibility. We brought in private-sector consultants, we went to school at the private industrial universities (such as Motorola University) to learn quality principles, we began the Baldrige Quality Award assessment process, and we co-opted the DOE leadership to join us in these endeavors. We began to re-engineer our business systems and our work processes, to implement an integrated safety management system, and we restructured the laboratory. These changes began to improve our productivity. The University of California also negotiated a performance-based contract with the DOE. Unfortunately, the DOE did not change its management system or oversight practices; nor did it adequately support the changes at the laboratories and the University. For example, at Los Alamos we did not get the necessary backing and cooperation of the DOE when we had to make difficult manpower decisions that were necessary to enable our productivity initiative. Unfortunately, the bottom line was that neither DOE nor the Congress was prepared to make the type of changes we were implementing, cutting short our ambitious re-engineering efforts. A great opportunity to fundamentally improve the laboratory's operations and its overall productivity was lost.

Strong Mission Support From the Government and the Role of the University of California

I would like to add a success story that ran counter to our disappointing experience in trying to change the operating environment for the better at the laboratories. In the 1990s, the DOE and the laboratories together successfully dealt with the changing mission requirements that accompanied the end of the Cold War. The collapse of the Soviet Union was as remarkable as it was unexpected. With the

backing of Charles Curtis, then DOE Under Secretary, the laboratory directors established successful threat reduction efforts with their counterparts in Russia. Most of the early cooperative nuclear programs with Russia were initiated by laboratory personnel with the explicit support of DOE. Under the leadership of then DOE Assistant Secretary for Defense Programs, Dr. Victor Reis, the laboratories helped to forge the nuclear weapons stewardship program. The laboratories also began an effort in the mid-1990s to help the country develop technologies necessary to deal with terrorism and weapons of mass destruction. These changes were profound and essential to our national security. The programs and changing missions were strongly encouraged and supported by Congress. Unfortunately, the same was not true of helping us deal with the deteriorating operational environment at the laboratories.

I had the fortune of leading the Los Alamos National Laboratory during these historic times. I began to increasingly appreciate the role of the University of California in dealing with these complex issues. The University not only provided a technical peer review system for all of our laboratory's technical activities to make sure they remained world class, but it also had the convening power to engage high-level advisors that helped me and our laboratory management to think through the necessary mission and operational changes. With the strong backing of the University and its advisory council, then director of the Lawrence Livermore National Laboratory, John Nuckolls, and I visited the Russian nuclear weapons laboratories in February 1992, less than two months after the dissolution of the Soviet Union. We initiated many cooperative activities that helped to lessen the dangers inherent in the Russian nuclear enterprise faced with a sudden and dramatic breakdown of its government and its economy. We received the University's backing in spite of the fact that these initiatives were very risky and that liability issues had not been directly addressed. The University's own public service orientation and the special nature of the GOCO contract that still prevailed at that time made this possible.

During the 1990s, the DOE and the laboratories also faced some difficult decisions with respect to arms control agreements, nuclear weapons safety, nuclear testing, and the evolution of stockpile stewardship. It was essential that the laboratory directors provided the best technical advice to the government, regardless of its political correctness. The directors, in spite of the fact that they did not work for the federal government, had to act as public servants because these issues were of an inherently governmental nature. Beginning in 1996, the directors of the three DOE weapons laboratories were asked to certify the nuclear stockpile with letters to the secretaries of Defense and Energy (who then advised the President). To sign the letter that states: "I certify the nuclear weapons in the stockpile that our laboratory has designed to be safe and reliable, without nuclear testing at this time," the directors should not be motivated by personal salaries, corporate fees or corporate profits. The directors can do this job responsibly only by acting as an extension of the Department—as "public servants." It is the very nature of the GOCO partnership that allowed the directors to do so. Furthermore, the regents and the president of the University of California made it clear that they expected me to place the national interest above all. They provided the backing and the confidence for me to make the tough decisions we faced during this time. Over the years, the presence of the University of California in the nuclear weapons complex also enriched the debate about the role of nuclear weapons and their stewardship.

Political Turmoil and Serious Setbacks for the Laboratories

I left the directorship at Los Alamos in November 1997 to return to my research interests and to spend more time on the threat reduction activities with the Russian nuclear complex. I remained at Los Alamos because I believed this was the best way to serve my country. My principal research interest is plutonium metallurgy. Potential problems with the re-manufacture of plutonium pits for weapons or problems with the aging of existing pits are at the heart of the challenge of stockpile stewardship that is, keeping our nuclear weapons safe, secure, and reliable. I helped to craft the concept of science-based stockpile stewardship—now I wanted to help it succeed. I wanted to attract the best young talent to this task and I hoped to help restore a productive work environment for plutonium research. I knew that the working environment at the laboratory was no longer the nirvana that I experienced when I first arrived, but I found that it had deteriorated even more than I had realized as director.

Unfortunately, two unfortunate events caused even more severe damage to the work environment at Los Alamos—the Wen Ho Lee security affair that came to light in 1999 and the missing hard drive incident in 2000. Both incidents raised serious questions about security practices at Los Alamos and at DOE. However, instead of careful analysis of how to correct the cyber and counter-intelligence weaknesses that the case exposed, the politically charged environment resulted in reactions in Con-

gress and by the DOE leadership that proved devastating for the laboratory and the entire system of laboratories. Additional security measures were enacted at the laboratories that were not well thought out and that could have disastrous long-term consequences for the laboratories and the ability to fulfill their missions. For example, polygraph testing was implemented in spite of substantial scientific evidence that it is unreliable (a view recently confirmed by a study by the prestigious National Academies). Insufficient consideration was given to the down side of polygraph testing; that is, not only what to do about false positives and false negatives, but also how to deal with the overall damaging effect such testing has on recruitment and retention). In the case of the hard-drive incident, the security frenzy led to an FBI investigation that utilized strong-armed tactics in one of the most sensitive divisions of the laboratory, resulting in the creation of a hostile work environment.

The concerns about the government's reaction to the security incidents at Los Alamos are shared by others, who perhaps can view these incidents more dispassionately than I. John Hamre, chair of the Commission on Science and Security established by the Secretary of Energy in October 2000, recently summarized his concerns based on the Commission's report in *Issues in Science and Technology, Summer 2002*. Hamre stated: "The commission concluded that DOE's current policies and practices risk undermining its security and compromising its science and technology programs. The central cause of this worrisome conclusion is that the spirit of shared responsibility between the scientists and the security professionals has broken down." Hamre continued: "The damaging consequences of this collapse of mutual trust cannot be overstated. It is not possible either to pursue creative science or to secure national secrets if scientists and security professionals do not trust each other." He also pointed out that to fix these problems the DOE must confront the long-standing management problems in the Department. Donald Kennedy echoed many of the same concerns about the Department's approach to security in his editorial in the 23 May 2003 issue of *Science*.

Unlike the security environment, the operational environment in the laboratory's experimental facilities (especially the plutonium facilities) suffered no catastrophic event, but instead faced continuing erosion in our ability to do experimental work. The safety and environmental regulations continued to become increasingly prescriptive. In spite of our progress in implementing integrated safety management systems and improving our nuclear operations, more DOE oversight was prescribed and approval through the DOE maze became increasingly cumbersome. More and more, the key safety decisions were moved from knowledgeable engineers and scientists to overseers with little hands-on nuclear experience. I realize that DOE must provide oversight of our operations; after all it is the owner and has a responsibility to the public. However, for the reasons discussed before, DOE oversight has evolved over the years to become so intrusive and counterproductive that it has diminished our scientific quality and productivity.

Let me provide you with one of the most egregious examples of an approval system gone awry. It is the tale of a colleague who had an experience far removed from that I experienced when I started at Los Alamos as a student. In early 1992, he began to design and build a full-scale hydriding test facility for plutonium pits at our TA-55 plutonium facility. In spite of the fact that his project was of great importance and significant urgency for stockpile stewardship, he was not able to run his first experiment until December 1999, almost eight years later. The Tiger-Team atmosphere slowed down initial approvals and the paperwork became excruciatingly cumbersome. In spite of excellent design and engineering work, the project suffered repeated delays due to additional reviews and approvals required by DOE. The flammable gas issue associated with hydrogen alone required three and a half years approval through DOE Los Alamos Office, DOE Albuquerque, and DOE Headquarters. In spite of some 18 to 20 reviews of the system and eight years in preparation, only two minor physical changes were made to the system. How can we meet our mission requirements and how can we prevent our scientists and engineers from giving up in frustration in this type of an environment? In addition, changes in indemnification now threaten laboratory employees working directly with nuclear materials with Price Anderson violations, which presents an additional impediment to getting people to do experimental nuclear work.

During this time we also experienced increasing micro-management and a loss of flexibility in the laboratories' technical and programmatic activities. Over the years, DOE provided the programmatic requirements and broad budgetary flexibility, whereas technical decisions were made at the laboratories. Now, both congressional committees and DOE insisted on budgeting and managing programmatic activities at an increasingly finer scale to achieve greater accountability. Unfortunately, this shifted more of the technical decision making to DOE Headquarters and limited the

flexibility at the laboratories to do the best possible job. So, although today the overall budgets are sufficient to get the job done, the compartmentalization of the budget diminishes our ability to do so effectively.

These problems and the conclusions of the Hamre Commission and the Galvin Task Force paint a very different picture from that of numerous governmental audits and investigations by offices such as the GAO or the Inspector General. These audits consistently fault the DOE for lack of sufficient oversight. None of these reports laments the lack of trust and flexibility, or the fact that an environment has been created in which we cannot get our work done productively. Instead, trusting a contractor is treated more like an offense than a necessity. Moreover, the GAO and IG reports become ammunition for congressional hearings, which often lead to further admonition of DOE practices. DOE officials, in turn, become more prescriptive in their management and oversight. This cycle has repeated itself many times during the past dozen years, resulting in the loss of trust and the loss of the partnership concept that made the laboratories successful over the years. Moreover we lost many good people who gave up in frustration.

In an effort to improve the ability of the government to conduct its nuclear national security mission, Congress created the semi-autonomous National Nuclear Security Administration to carry out the national security responsibilities of the Department of Energy, including maintenance of a safe, secure and reliable stockpile of nuclear weapons and associated materials capabilities and technologies; promotion of international nuclear safety and nonproliferation; and administration and management of the naval nuclear propulsion program. The NNSA officially began operations on March 1, 2000. In my view, the previous DOE administration resisted the autonomy of the new administration and hampered its effective implementation. In General John Gordon and Ambassador Linton Brooks, the NNSA has had the type of competent, nonpolitical leadership that Congress envisioned. Ambassador Brooks has made some positive changes such as the organizational changes he announced on Dec. 18, 2002. However, the difficulties in the structure and operational environment run deep in the organization. I believe that he will need encouragement and help from the Congress to make additional operational improvements in the NNSA.

THE CURRENT CONTRACTING CRISIS AND A PATH FORWARD

The latest crisis in governance and contracting was triggered by concerns over poor procurement and property management practices at Los Alamos. Although many of the initial accusations and headlines have proven incorrect or misleading, much needs to be and is being done to improve business practices at the laboratory. These concerns brought into question the University of California's ability to manage the laboratory, and they triggered several congressional hearings. At the end of April, Secretary Abraham decided to compete the Los Alamos contract for the first time in its 60-year history. Quite naturally this decision is causing serious concern and unrest within the Los Alamos workforce.

The regents of the University of California have not yet decided whether or not to compete for this contract. In my opinion, the University has served the nation with distinction by operating the nuclear weapons laboratories at Los Alamos and at Livermore since their inception. However, that success was made possible by the very nature of governance and the partnership inherent in the GOCO contracting model. As pointed out, this model has been effectively dissolved over the past dozen years, and the University has come under increasing criticism for its management of the laboratories. Unless the next contract begins to restore the partnership between the government and the contractor, it may not be in the University's or the nation's best interest to continue with UC management. Moreover, I believe that no contractor will succeed unless the governance model is fixed.

Mr. Chairman, your hearings are designed to examine governance and contracting. As I have pointed out, the GOCO M&O contract was designed as a partnership to steer between the alternatives of a completely federal operation and a procurement-oriented, contract operation. As missions evolved and as public expectations of these institutions changed, the laboratories were often slow to make the necessary changes. However, rather than working with the laboratories to institute the necessary changes in the spirit of the GOCO partnership, the DOE typically responded to public criticism and congressional pressure with new orders, rules, and contract terms that fundamentally shifted governance away from the GOCO partnership toward a hybrid federal operation and procurement contract operation. The lines of responsibility and authority between the DOE and the contractors have become blurred, with more and more of the operational decisions made by federal employees, but more accountability and liability shifted to the contractors. Consequently,

it has become increasingly difficult for contractors to take the public-service approach required for nuclear weapons stewardship, to nurture world-class science, to deal with the risk of nuclear operations, to provide a buffer from political pressures, and to provide the continuity necessary for stewardship. These changes were made not by design with the best governance in mind, but rather resulted from the accumulated reactions of the DOE to government audits and congressional pressure. The net result has been to significantly diminish the ability of the laboratories to accomplish their missions and to dramatically reduce their productivity. The laboratories are on the cusp of being irreparably damaged as scientific institutions in service to the nation.

Now one must make a clear choice. On one hand, one can follow that path that is, respond to every problem by increasing federal oversight, increasing the presence of federal on-site employees, writing more rules, stepping up audits, and increasing penalties and fees for noncompliance. This approach has led us in the direction of making the laboratories look and act increasingly like federal institutions with a major toll on scientific productivity. On the other hand, one can try to revitalize the GOCO partnership to ensure that we are able to continue to attract the best scientific and management talent to the nation's nuclear weapons enterprise and to bring the best practices from the private sector to bear on their operations.

I mentioned that the GOCO concept as originally conceived was deliberate, innovative, and successful. I believe that the current situation is none of the above. The current system of governance is not deliberate. The GOCO partnership has been effectively dissolved by a series of piecemeal actions mostly in response to the crisis de jour, not by design. The current system is bureaucratic not innovative. The organizational lines of authority have become blurred and ineffective. It leans heavily toward a GOGO mode of operation, which has not distinguished itself in practice in the rest of the government. And the current system is not successful. The prescriptive mode of operations and the enormous burdens of federal oversight and micromanagement have taken an unacceptable toll on the scientific quality and productivity of the laboratories. Moreover, it is becoming so difficult to get work done at the laboratories that it will be very difficult to attract the talent required for the demanding missions. I believe that the best way to redesign the system of governance and to reestablish a productive work environment is to charter a high-level Blue Ribbon Task Force, one that would follow up on the previous Galvin Task Force and Hamre Commission and help to design a vastly improved system of governance and contracting for the future.

Based on my experience at Los Alamos, I view the following as necessary ingredients of a successfully redesigned system of governance:

- *Partnership based on trust between government and contractors.* The inherently governmental nature of the nuclear weapons enterprise requires rebuilding a partnership based on trust and a long-term contracting commitment. Congress should steer governance back toward a partnership and away from emulating federal operations or a procurement-oriented contract model. Although the government must verify trust, it must concurrently nurture it to ensure safe, secure, environmentally, and cost-effective operations of the nuclear weapons enterprise.
- *Scientific excellence and integrity.* Fostering creativity, innovation, and freedom of expression, in a highly classified environment, is essential to providing and certifying a reliable, safe, and secure nuclear deterrent. Hence, the contractor of a nuclear weapons design laboratory should have a strong tradition of scientific excellence in research management and unwavering technical integrity. It should also have the reputation and convening power to attract the best talent and the best advisors to the laboratory. The two design physics laboratories at Los Alamos and Livermore should be managed by the same contractor to foster competition for ideas rather than for corporate profits or market share.
- *Public service in the nation's interest.* The directors of the laboratories must discharge their duties, especially the certification of the nuclear stockpile, to be in the best interest of the nation, and not be motivated by personal benefits, corporate fees, or corporate profits. This requires institutions steeped in public service and a special contract with indemnification provisions to deal with the high risk of nuclear operations. Recent changes in contracting have made it increasingly unattractive for not-for-profit organizations such as universities to operate the laboratories in spite of the fact that it is precisely these institutions that have a distinguished history of public service.
- *Safe, secure, and effective nuclear operations.* To deal with the inherent risks of nuclear operations requires a contractual relationship with special indemnification provisions, a risk-based approach to both safety and security, and

clearer lines of authority within the government. Those functions that require regulatory oversight and compliance should be made independent of the Department.

- *Best business practices.* Encouraging business reforms based on quality approaches as used by U.S. industry rather than forcing compliance with federal procurement, personnel, and business practices are necessary to make the laboratories more productive and to attract best business and management talent. Such reforms will require substantial changes to current contracting language, which has increasingly forced practices into the federal mold. Contracts should be performance based, focused on outcomes. The DOE should return to specifying what the contractors are required to do, then hold them accountable for delivering results, and not prescribe how it should be done.
- *Government reform.* Providing for an organizational structure in the DOE that provides clearer lines of authority, and garners bipartisan political support, is essential for the future of the nuclear weapons enterprise. The establishment of the new National Nuclear Security Administration was a step in that direction, but more needs to be done. This will require strong backing of Congress.

CONCLUDING REMARKS

Mr. Chairman, the fact that you are holding a series of hearings to examine the system of governance and contracting practices at the laboratories gives us hope that these issues will receive the attention they deserve. At stake is nothing less than restoring the scientific productivity of the laboratories and the successful execution of the nation's stockpile stewardship mission. In addition, congressional actions over the past several years and your tireless efforts on behalf of our nation's defense preparedness have also sent a clear signal that these laboratories are needed more than ever. Thanks to you and your colleagues, we have an important mission, we have financial support, we are upgrading our facilities (that includes replacing the CMR Building, which last year turned 50 years old), but the system of governance is broken and our operational environment is not productive and not conducive to attracting and keeping the best talent to do this important job for the nation. Sixty years ago our country devised an innovative concept, the GOCO partnership model, to bring science to bear to the nation's defense. This concept helped to end the most devastating war in history. It helped end the Cold War in our favor and to the benefit of all of mankind. Now we are not threatened by a similar external enemy, but instead we have ourselves brought on a crisis in the effectiveness of our laboratories and, consequently, in the nation's nuclear weapons stewardship. These internal problems are often more difficult for the United States to overcome than defeating an external adversary. However, this time the stakes are too high not to act. I know that all of my colleagues at the laboratories and the University of California are prepared to do our part.

The CHAIRMAN. Thank you very much, Sig.
Dr. Peoples.

STATEMENT OF DR. JOHN PEOPLES, JR., DIRECTOR EMERITUS, FERMILAB, BATAVIA, IL

Dr. PEOPLES. Mr. Chairman, thank you for giving me the opportunity to comment on the evolution of the relationships between the Department of Energy and its M&O contractors that operate the Department of Energy laboratories.

When I became Director of Fermilab in 1989, the Department was struggling to deal with problems in the clean-up of old weapons production facilities and the downsizing of then-existing production facilities. The public and Congress were very critical of the Department's management of those facilities.

In response to those criticisms, the Department chose to address these problems with a very prescriptive, compliance-driven management system that was applied to all departmental facilities, including the national laboratories. Now, typically—at least in the Office of Science—a consortium of universities or a single university operates one or more laboratories. Exceptions which were in

the weapons program were Sandia National Laboratories, which was operated by AT&T, and Oak Ridge, operated by Martin Marietta. URA manages Fermilab. That represents 83 universities, and it is essentially all the major universities that are interested in the high energy business.

The contractors that operated these laboratories did so as a service to the Nation on the principle of no loss, no gain. This has served the Nation very well since World War II. I think it still serves the Nation very well. The universities were also motivated by the desire to give their facilities and students access to large facilities such as accelerators and reactors that only the Federal Government could afford. In 1971, that is what got me to go from Cornell, where I was a happy university professor, to work on an experiment. I have not gone back yet.

Now, the management of these laboratories, as my predecessors have said, began as a set of long-term partnerships between the contractors and the AEC. However, by the mid-1980's the partnerships had begun to degenerate into buyer-seller relationships for research, and the Department was seriously questioning the value of M&O contracts. Some people in the Department looked on long-term partnerships with universities as an unfortunate consequence of the past, or rather, an accident of the past.

Now, the Packard Panel in 1983, the Grace Commission in 1985, the Galvin Committee in 1995, looked at the governance of these laboratories. They all more or less came to the same conclusion. Since their findings are similar, I just want to comment on the Galvin Committee. That report found that DOE oversight of M&O contractors that managed the laboratories had become an expensive compliance management system. It was compliance-driven. It brought little value for the costs that it imposed upon the labs.

They found the M&O contractors were subject to excessive regulation and management by many organizations: the field offices, the site offices, the various headquarters, ES&H offices, the program offices. I could go on. There were some I did not realize existed, but they could create orders. They found little value in this burden. On top of this, the M&O contractors had to comply with appropriate Federal, State and local laws and regulations. Now, I said "had to." It really is the appropriate thing to comply with Federal, State and local regulations. At the time, DOE orders had become so prescriptive and detailed that laboratory scientists and engineers had to set aside a significant amount of time to navigate and to comply with the orders, particularly those orders relating to environmental safety and health.

Also, those orders at the time were becoming unpredictable, partly because the machinery to create new orders was so well oiled that it appeared accountable to no one, and it could create conflicting orders.

Initially, there was no provision for review by the laboratories. When the laboratories were finally allowed to comment on new orders, the comments were largely disregarded. By 1996, the system had steadily become worse, in spite of the commitments of Secretaries Watkins and O'Leary to reform the system. The Galvin Committee believed that the situation was so out of control that they had recommended a totally different model of governance for

the laboratories. The Galvin Committee recommendations were never adopted—and I think that is actually appropriate—although Secretary O’Leary made a valiant effort to bring the process under control.

Now, prior to the Galvin report, Secretary Watkins produced the tiger teams in 1990 to bring about change in the ES&H culture in the laboratories. At the time, Congress and the public discovered that there were serious, well-publicized problems in the weapons production facilities such as Rocky Flats and Savannah River and the clean-up sites such as Hanford.

Secretary Watkins felt the problem was endemic to all DOE facilities, and that the tiger teams were his way to bring about change in the culture. The tiger teams were clearly rather controversial, but I think in the end they served a very good purpose. The directors of the laboratories understood what had to be done, we understood our problems, and we moved forward.

However, the Department used the opportunity to impose detailed, standardized, one-size-fits-all, et cetera, et cetera. It is not surprising that the Galvin Committee was critical of the DOE order system.

Now, in my written testimony I comment on two things: integrated safety management, which is also the necessary condition that gave the laboratories and the site offices in the field some latitude to work on these problems. It restored a bit of partnership. I also commented on something called Work Smart standards, where again a notion of partnership was brought back between at least the field and the site offices.

These things led to a substantial improvement in DOE safety record. It wasn’t that bad before, but there were aspects of it that needed improvement. It is now outstanding. I have commented on two areas of oversight and control in my written testimony, but I would like to go to one other thing that I think was rather important. Both Secretary Watkins and Secretary O’Leary had promised line management. It is a very simple concept, it is a very powerful concept. The problem with the Department from its inception is that the business side, the administrative side, the safety side, went up probably to the Deputy Secretary and there it disappeared; not that the Deputy Secretary did not work hard, but the Deputy Secretary and Under Secretary have a lot of other very important things to worry about.

On the program side, it went to the Director of the Office of Science, at least in the Office of Science, so basically there was a disconnect. We know that that is being restored. The Office of Science seems to have the responsibility for all parts of the program, including management. Management is very important. I trained as an engineer, with an avocation as a scientist, I tell people I am genetically an accountant. I find this very interesting. I really like that part of the business, as well as the science part. I think by concentrating on these very different mission organizations—the ability to manage the entire program, including the business side, is extremely important.

Let me just close by stating I am very proud to have worked for more than 30 years in the Department of Energy laboratory systems. I have a very high regard for the Department and what it

can do for the Nation's research enterprise, and I have a very high regard for the people in the Department who helped make it happen. I am afraid that Congress has an awful lot to do with some of the disconnects. Now, it is important to have oversight. And I think oversight is important, and it ought to be carried out carefully, thoughtfully. But because of the way DOE laboratories are structured, the partnership aspect is very important.

In my written testimony, I hope I show that that partnership can be made to work and work for safety and work for administrative things.

I hope that you are successful in outlining a plan, as Martha had described, because I think the future of these laboratories is with the GOCO concept. All other methods have been tried in DOE and the Defense Department, and I don't think they work very well. Contact with universities is extremely important. As I said, that is why I wound up being a director.

Thank you for letting me speak.

[The prepared statement of Dr. Peoples follows:]

PREPARED STATEMENT OF DR. JOHN PEOPLES, JR., DIRECTOR EMERITUS,
FERMI NATIONAL ACCELERATOR LABORATORY, BATAVIA, IL

Mr. Chairman thank you for giving me the opportunity to comment on the evolution of the relationships between the Department of Energy and the Management and Operating (M&O) contractors that operate the national laboratories for the Department and the impact that the changes in those relationships have had on the ability of scientists to respond to national missions. Since I gained my knowledge of these relationships through my work with the laboratories that are directed by the Office of Science and its predecessor, the Office of Energy Research, I will limit my comments to those laboratories.

When I became the Director of Fermilab in 1989, the Department was struggling to deal with problems in the cleanup of old weapons production facilities and the downsizing of the then existing production facilities. The public and Congress were very critical of the Department's management of those facilities, and in response to these criticisms, the Department chose to address these problems with a very prescriptive, compliance driven management system that was applied to all Department facilities, including the National Laboratories. Typically, a consortium of universities or a single university operated one or more of the laboratories. The exceptions were Sandia National Laboratory, which was operated by the American Telephone and Telegraph Company, and Oak Ridge National Laboratory, which was operated by the Martin-Marietta Corporation. These contractors operated the laboratories as a service to the Nation on the principle of "no gain-no loss," which had served the Nation very well since World War II.

The universities were also motivated by the desire to give their faculties and students access to large research facilities, such as accelerators and reactors, that only the Federal Government could afford. The management of these laboratories had begun as a set of long-term partnerships between the contractors and the AEC. However, by the mid 80's the partnerships had begun to degenerate into buyer-seller relationships for research and the Department was seriously questioning the value of M&O contracts. Some people in the Department looked on the long-term partnership with universities as an unfortunate accident of the past. The Department's governance of the laboratories was reviewed by the Packard Panel (1983), the Grace Commission (1985), and the Galvin Committee (1995). Since their findings were similar, I will just comment briefly on the findings of the Galvin Committee.

The Galvin report found that the DOE oversight of the M&O contractors that managed their laboratories had become an expensive, compliance driven management system that brought little value for the cost that it imposed on the laboratories. They found that the M&O contractors were subject to excessive and unnecessary regulation and micromanagement by many Department organizations; the field offices, the site offices, various headquarters management and ES&H organizations, and the program offices. They found little value in this burden. On top of this the M&O contractors had to comply with appropriate federal, state, and local laws and regulations. At the time DOE orders had become so prescriptive and detailed that

laboratory scientists and engineers had to set aside a significant amount of time to navigate and comply with DOE orders, particularly those orders related to Environment, Safety and Health. The orders were rapidly becoming unpredictable since the machinery to create new conflicting orders was well oiled and appeared to be accountable to no one. Initially there was no provision for review by the laboratories and when laboratories were finally allowed to comment on new orders the comments were largely disregarded. By 1996 the system had steadily become worse in spite of commitments from Secretaries Watkins and O'Leary to reform the system. The Galvin Committee believed that the situation was out of control, and they recommended a totally different model of governance for the laboratories. The Galvin Committee recommendations were never adopted, although Secretary O'Leary made a valiant effort to bring the process under control.

Prior to the Galvin Report Secretary Watkins introduced the Tiger Teams in 1990 to bring about a change in the ES&H culture in the Laboratories. At the time Congress and the public discovered that there were serious, well publicized ES&H problems in the weapons production facilities, such as Rocky Flats and Savannah River, and the cleanup sites, such as Hanford. Secretary Watkins felt that the problems were endemic to all DOE facilities and the Tiger Teams were his way to bring about change in the culture. The value of the Tiger Teams was very controversial among the laboratory directors because each laboratory had to devote all of its resources to dealing with the three week sixty to eighty-person Tiger Team visit for two months. These visits got the attention of the directors, and in spite of the disruption that they caused they accepted the process. After each visit each director and his staff recognized what needed to be changed and they set about making the necessary changes. However, DOE headquarters used the opportunity to impose detailed and standardized "one size fits all" orders and this led to the aforementioned proliferation of proscriptive orders. It is not surprising that the Galvin Committee was critical of the system of DOE orders.

One major flaw in the Department's management was the attempt by headquarters to craft orders that would apply uniformly to every contractor operated facility in the system; dedicated program laboratories, multiprogram laboratories, weapons laboratories, weapons production facilities and so forth. The orders were issued to the field and then to the laboratories without regard to what each facility did. ES&H orders dealing with radiation were particularly ill suited since they seemed to be written for reactors that produced material for nuclear weapons, as opposed to accelerators for particle and nuclear physics, synchrotron light sources, and research reactors. Ultimately this bad situation was corrected when the Office of Science was allowed to develop procedures for radiation safety and operations for these facilities with the help of the DOE field offices. While the new procedures are still largely compliance driven, they address issues that are appropriate for these facilities. This has certainly helped to ease the burden on the scientists and engineers.

I am not aware of any DOE order that has gone away, although some may have. My ignorance about this should not be surprising since I have worked as a scientist for the past four years. Provisions that allow the site office and the laboratory that it oversees to determine which of the many orders to apply have eased this very difficult situation for some laboratories. The orders were not ignored. Specific orders were replaced by existing industrial standards that were appropriate for the type of work that a laboratory was performing. This made it possible to remove DOE orders from a particular M&O contract that did not add value. There is still plenty of oversight from the appropriate operations office, the management offices in headquarters, and the oversight groups in the Office of Science to ensure that each laboratory is in compliance with the appropriate orders and external regulations. This has allowed the Fermilab management team and the DOE site office to work out a sensible plan for their site. I believe that this was a consequence of Secretary O'Leary's commitment. Another consequence of the Secretary's commitment was the implementation of a successful pilot program in management, which is called Work Smart Standards. Several laboratories were allowed to participate in this experiment. The process began by defining the criteria for necessary and sufficient standards. People from the Office of Science, the field, and the laboratory who were knowledgeable in safety and administration developed these criteria. Subsequently each participating laboratory defined its work processes and the appropriate regulations pertaining to each process in writing. Before the laboratory was allowed to implement these processes the appropriate field office and the Office of Science reviewed them. After adjustments, they were approved and the laboratory was allowed to implement them. In return, they were relieved of complying with those DOE orders that had been inappropriately applied to these work processes. The site office monitors compliance with Work Smart Standards. I believe that this is a very

successful process that has helped to reduce the burden of compliance and that has lead to a dramatic improvement in the safety performance.

Some time around 1997, DOE introduced the Integrated Safety Management program. While it started out as a proscriptive process, the field offices and the site offices gave the laboratories some latitude to implement it. The principles were sensible and the process straightforward. It was full of good common sense. It worked and it is another one of the reasons that the safety performance of the Office of Science laboratories went from average to excellent. The Department's Integrated Safety Management program is a partnership between the field and the laboratories. The Department defines what is expected, the laboratories prepare a plan for their work and after the site office approves it the laboratory implements the plan. Finally the site office, the field office and the Office of Science oversee the Laboratory's performance. This process works quite well and I believe that it has been extended to other laboratories.

I have commented on two areas of oversight and control of M&O contracts, the management practices of the contractors and DOE and the compliance with ES&H standards and DOE orders in general, that have improved since the Galvin report. In each case the improvement is a consequence of a partial return to a partnership between an M&O contractor and the Office of Science. It is also a consequence of the creation of a clear line of authority that extends from the Secretary to the Director of the Office of Science through the program and site offices that report to the Director of the Office of Science and then to the contractor responsible for operating an Office of Science Laboratory. The oversight of the contractor's performance in administration, safety and management as well as the contractor's performance in fulfilling the missions of the Department is now the responsibility of the Office of Science. This arrangement provides a continuity of management that has been missing since the creation of DOE. Before the introduction of line management, these functions did not come together and as a result the functions were fragmented. It is a fragile arrangement since there are forces in the Department that want to return to the clearly discredited past. Line management is a simple, but powerful concept that provides clear accountability. The Department will have this accountability in the Office of Science if it is able to complete the consolidation of program direction and oversight of the Office of Science facilities and the M&O contractors that manage them within the Office of Science.

I did not comment on the attempts to revise M&O contracts by trying to introduce metrics for performance based management into the contracts. As I understand the situation, very little progress was made on this very difficult matter in the past fifteen years. However, I have been told that there are efforts underway with several of Office of Science laboratories to try to introduce these principles in a meaningful way into M&O contracts again. Since most of the effort on performance measures was introduced after my tenure as Director, I cannot provide much first hand insight.

Let me close by stating that I am proud to have worked for more than thirty years in the Department of Energy laboratory system. I have a very high regard for what the Department can do for the Nation's research enterprise, and I have a very high regard for the people in the Department who have helped to make it happen. I hope that these hearings can give you insight on how the Department could better manage its programs to the benefit of the Nation.

The CHAIRMAN. Thank you very much. Thanks to each one of you for your excellent testimony, not only here today but your written testimony, which will be looked at carefully.

I noted that each of you in some ways are equal scientists because you each violated the 5-minute rule about equally. I said nothing about it, but you each took about 2½ to almost 3 minutes in excess, and that is splendid.

Our first votes will start occurring at 11 o'clock. Senator Lamar Alexander indicated he would return after the votes, so you are going to have to stick around for a while, even if we are finished, for him to ask some questions.

I'm going to start first, if you are ready, with you, Senator Craig. I yield to you.

Senator CRAIG. Mr. Chairman, I largely came to listen today to this panel, and to all of you, because of your expertise and experi-

ence. I am not going to suggest that I am an expert on any of this, although I have spent a good deal of time over the last number of years trying to understand and to cause by our efforts laboratories to operate openly and to have the flexibility to do what needs to get done, and to try to find the right missions that really challenge us in areas where only our laboratories—only you can do the work and the private sector cannot; nor, in many instances, will not. I have taken some notes today and listened. Mr. Chairman, I don't have specific questions, except for one. The governance thing obviously we will work on, the relationships with the Department in ensuring the leadership and stability and talent that is all a part of it. But tied to that, the longevity of a good partnership and contract appears to be awfully important to laboratories.

I believe, Dr. Postma, you mentioned contracts—and possibly, Martha, you did, also—as it relates to the 5 and 5 versus long-term contracts with the appropriate—not harsh, but appropriate—effective oversight.

Would any of you care—those of you who did not speak to that issue—I think, Dr. Peoples and Dr. Hecker, you did not—would you express the value you see in contracts? I am suggesting maybe not a 5 and 5, maybe a 10, or maybe a 5-year contract, obviously with the appropriate oversight that occurs by effective mileposts and being able to, obviously, from our standpoint, observe, as the Department would, the effectiveness of that kind of contract.

The CHAIRMAN. Sig; and Dr. Peoples, you are second. Would you answer his question, please?

Dr. HECKER. Yes. I would like to comment on that.

As far as the issue of continuity, of course it is especially important in the nuclear weapons business. At Los Alamos we have had the same contractor for 60 years, the University of California, so we can't say that continuity has been a problem. The bigger problem has been that every 5 years we go through significant turmoil in looking at the basis of the contract itself. There are changes made that in the end, through these reactions that I have mentioned, I think have actually degraded these relationships.

Senator CRAIG. Much like a rebid, then? Is that the kind of turmoil?

Dr. HECKER. It is interesting. In the case of the University of California at Los Alamos, it has actually never been rebid, even. But the Government, of course, each time it formulates the contract, can make the contract terms whatever it wants to, so it is in that process that the relationship has degenerated.

I would say that the 5 years have been tight. I would feel more comfortable with, let's say, a reasonable 10-year cycle. But the continuity aspect is important. However, more important is the nature of the contract itself.

Senator CRAIG. Okay.

Dr. Peoples.

Dr. PEOPLES. I will make two comments. One is the one Sig has just addressed, the rebidding contract. It is not so much rebidding, but there is a contract renegotiation every 5 years. The Department has used this process to introduce—or at least to try to shift risk—to university consortia. They don't have any particular way

of handling the risk, and it seemed to me this is just an ineffective way of proceeding.

If one wants to work with universities, and this is the case of the very basic science laboratories, then one has to realize what you are working with. Certainly, the trustees are not going to allow to have their endowments set at risk. I think the problems the laboratories run into are relatively small.

I suppose if you wanted to you could allow insurance to be an allowable cost. These relatively small things, which are what the people are talking about, could be handled that way.

The other thing is, what about the length of the contract? The 2002 names of the major contracts, CDF and the DO—one will probably end in 2008 or 2009, and the other one started years later—these are very long-term enterprises. The main purpose of contractor is to provide oversight, select a director, and to make sure that the laboratory carries out its business properly. The Department of Energy really determines with the scientific community what type of research projects will be undertaken. That is through KEYPAD and whatnot.

I don't know what you would do to replace a URA. You would still want to have this kind of influence from the universities, but it is probably useful to at least make sure that there is a process that would allow rebidding. But I don't think the 10 years is particularly long for the work that has to be done.

Senator CRAIG. Dr. Krebs.

Dr. KREBS. Two comments. I think what has happened—and Dr. Hecker raised this—is if you were to look—and it might be an interesting thing as background for part of this hearing series—if you were to have somebody to look at how the contract, the individual contracts for, say, one or two or three labs, have changed over the last 20 years, it is significant.

The character—you can actually peg them to different things that have happened, along with different kinds of oversight, over the last few years.

I think that the committee needs to look at that and ask the question, does it really make for better management? The contract also has become a vehicle for adversarial interactions as opposed to cooperative interactions. Part of the complexity of the negotiation is to facilitate, from the Department's point of view, this adversarial interaction. That is mostly driven by people outside of the programs, in DOE but outside of the programs. That argues for Dr. Peoples' interest in seeing the programmatic and managerial issues all given to a program officer.

Senator CRAIG. Would you wish to comment on this, Dr. Postma?

Dr. POSTMA. I have been involved with a number of transitions of contracts, with Union Carbide, in which they had indicated it was not within the corporate mission anymore and they gave up the contract. They were not kicked out. Then Lockheed Martin, or Martin Marietta first and then Lockheed Martin when they merged, became the contractor. Then later the University of Tennessee and Batelle became the contractor in Oak Ridge.

They were not all that traumatic, actually. There were good things that happened as a result of the change. In the eagerness to please the Department of Energy in the contract, each of these

people made rather large concessions towards improvement of certain capabilities. In fact, the University of Tennessee Batelle enterprise came in and actually committed a large amount of State funds to build buildings that should have been built 20 years ago and leased them from third parties, backing it up with State Government funds. Also, Batelle put its corporate funds at risk to do this. That is tremendously innovative. That would never have happened had the contract remained as it had been.

There are good circumstances that result from changing contractors, and I just didn't want it to happen too often. When things spin around too fast, people don't really know where they are, and nothing settles down to the point where you really achieve things as well as if there is a view of continuity.

Senator CRAIG. Thank you all.

Mr. Chairman, thank you.

The CHAIRMAN. Senator Bingaman.

Senator BINGMAN. Thank you very much, Mr. Chairman.

This may just be sort of paraphrasing or restating some of what several of you have said, but when I came to the Senate 20 years ago, my strong impression was at that point the preference within the Department of Energy was to renew contracts, maintain the current contractors, and—at least that was my strong sense with regard to the two laboratories we have in New Mexico.

Now it seems as though the bias is the other way. The bias is towards competing when contracts come up. We are going to compete, unless someone can demonstrate a reason we shouldn't.

To me, the most obvious example of what I am talking about is the decision the Secretary just made a month or a couple of months ago to compete the contract at Los Alamos in 2005. I think the contract comes up for renewal in September 2005, and he decided 2 months ago, well over 2 years in advance of the end of that contract, that he was going to compete it when it comes up. He announced that. It didn't make any difference what the current director or his management team was able to do by way of improvements at the laboratory, he was still going to compete the contract.

It seemed to me that is an example of the bias towards competing these contracts, which I think strengthens the case for going to longer contracts, for taking some other action to reestablish the stability between the Department and the laboratories themselves.

I do think that—I think, Dr. Krebs, you made the point very well. You used the phrase, we need to create an environment where creative science can happen in the laboratories, and where we can attract the very best scientists and engineers and retain them there to work on these important national priorities.

But as I say, it seems to me that this change in bias towards competing these contracts every time they come up does cause us—cause me to think we need to rethink this whole process.

I don't know if any of you have comments about that, as to whether you agree or disagree.

Dr. Hecker.

Dr. HECKER. Yes, I would like to make a couple of comments. Certainly, you know, competition is the American way, so it is awfully difficult to just argue against competition for its sake. But if it is the American way, competition should result in something bet-

ter. We at Los Alamos and the University of California, of course, cannot claim that this has all worked against us since we have been there for 60 years, which is a long, long time. So competition by itself is not bad, particularly the example you just brought up.

However, I think what concerns us, my colleagues and myself at the laboratory, it was done in such a political environment that we have no faith at all that this competition will actually produce something that is better for the country, rather than just taking care of the political burrs that were there at the time.

I think it is awfully important when we structure that and compete these contracts to make sure that not only you get the sense that you will get something better, but that the people at the laboratory also have some faith in the system that competition is being conducted for the best of what is in the national interest.

The CHAIRMAN. Dr. Hecker, how do you equate the atmosphere going on at Los Alamos when this decision was made to a political decision when the air was filled with accusations regarding malfeasance? Are they the same, accusations of malfeasance equals political?

Dr. HECKER. No. I didn't mean it in that sense, Senator Domenici. If you look at the competition issue, I think if sometime ago the Secretary would have said that, look, when the next contract comes around, we are going to seriously look at this competition issue. But instead, the decision was made, after, indeed, some accusation, in this particular case, of purchasing or procurement fraud, et cetera. To make at that time a decision so momentous as the competition of the laboratory, I personally didn't think that was commensurate with the issue that was there.

As these issues have played out, the major accusations that were made I think have proven not to be true. So I think if that would have played out in the proper arena and then the government come back and say, look, this has been done by the same contractor for 60 years and it is time to reexamine that, I think all of us would have to say, well, that is a reasonable thing to do.

The CHAIRMAN. Dr. Krebs, did you have a comment?

Dr. KREBS. Yes. Reflecting on both what Sig has said and your comment, I think that it would be worth recounting the experience that I had when I was in the Office of Science with the Brookhaven renewal, or competition.

Perhaps you remember that it was found that there was a radioactive contamination that occurred as a result of the research reactor on the Brookhaven site. It was a very minimal, determined to be non-dangerous to either on-site personnel, and it had not reached off-site. But there was a huge public outcry on Long Island, and there were difficulties. That was exacerbated by some of the management issues within the laboratory, I would say.

But the Secretary at that time decided that not only would they compete the contract, but they would compete it immediately. So the length of a contract does not necessarily preclude a Secretary from making such a decision to recompetite immediately. In fact, I think one of the good things that was done at Los Alamos was at least to give a reasonable amount of time and not recompetite until the end of this current contract.

But it is the case that certainly, because of the character of the infraction and the speed with which—or the timing that the decision was made to recompute the Brookhaven contract, there is no question that within Brookhaven and even outside of Brookhaven it was viewed as a political decision essentially driven by political considerations, whatever they may have been.

That is one of the difficulties that I think—with what the Department does and how it looks by not just the leadership of the laboratories, but by the people who really accomplish the work at the laboratories.

Senator BINGMAN. Thank you very much.

The CHAIRMAN. Thank you. We have a vote. I'm going to come back.

Senator, before you leave, and maybe this would be of interest to you also, I asked my staff to see if they could acquire a copy of the Los Alamos contract. That is the Los Alamos contract when it was first entered into. As a matter of fact, Senator, it is marked "secret." At that point it was a secret document. I looked at it. It was 29 pages. That was the whole document that governed the relationship with that great laboratory. This is the most current. It makes references to library documentation, which we cannot bring because it is so voluminous.

I only make that point that somehow or other this Secretary is struggling as to how he is going to—the reason for this hearing—he has been struggling on what kind of criteria is he going to use for the next contract. I guess this proposes a couple of words. Can you govern it with a simple contract that is not very lengthy, or are you supposed to have one like this that covers, I assume—every 4 or 5 years, perhaps when something went wrong—there are 15 or 20 pages added here; or maybe every 5 years, I don't know.

This clearly indicates—it might look like 60 years of one contract, but it sure looks to me like something much more than one contract in that 60-year period. That doesn't conclude anything except that they are having a heck of a time managing when there are malfeasance accusations and when things don't go right.

I am obligated to come back for a few minutes because I have some questions. So if you will wait, we will vote and come back.

[Recess from 11:16 a.m. to 11:45 a.m.]

The CHAIRMAN. Back on the record. Our second vote was called off. I am not sure Senator Bingaman can return. Nevertheless, he is on the floor.

Senator Alexander, it is your turn, if you would like to inquire, please.

Senator ALEXANDER. I would. First, I want to thank the witnesses and commend the chairman. This is a subject that interests me a lot. I know it interests Senator Domenici, because this has been a passion of his for a long time. I look forward to the subsequent hearings, Mr. Chairman, and being actively involved in them, and hearing from the witnesses.

I apologize for missing your testimony, but I have read it. And I have been hearing Herman. I am delighted to hear Dr. Postma here, one of our distinguished Tennesseans. I just want to say a word and then I have a question.

I come at this from this background. As a Governor, I worked with Oak Ridge and the University of Tennessee. As president of the University of Tennessee, I worked with the same situation. I was also on the board of Martin Marietta. I remember the negotiating of the contracts at that time. Then, as Energy Secretary, I saw a chance to put in perspective the contributions our national labs have made. This is a good time to be thinking about that as we look to the near future.

The National Academy of Sciences says half of our new jobs have come from our investment in the physical sciences and what we have tried to do, our great secret weapon in the United States, I believe, in science and technology, has been our great research universities and our national laboratories since World War II. No other country in the world has anything that comes close to the combination of those resources.

Given the challenges we face in keeping good jobs in this country over the next 10, 20, 30 years in the world marketplace, that edge in science and technology, a significant amount of which comes from our national labs, as well as from the universities, is a very important part of any national strategy.

So I have a whole lot of interest in this because of my own background, because of the contribution—the effect it has on Tennessee, and because of the effect it can have on our country. Now, in the comments, I also agree with the direction of many of the comments. I know what an academic environment is. Academic institutions are sometimes arrogant and they are sometimes messy, but basically they are set up to create little areas of autonomy where very talented people can do their best work. When government comes in too heavily on that kind of environment, that is exactly antithetical to that sort of environment.

When, for example, we have environmental problems and we have to send in government teams to deal with the problems, I guess that is something we have to do, but it takes the eye off the ball of what most of the people are there to do and what we most need done in this country. We want the clean-up, of course, but we want the continued research and technology.

When micromanagement—the Federal Government, as has been noted in some of your testimony, never undoes anything. Whatever layer it lays on just lays on, and then here comes another layer. There is never any consistent force up here. And we can provide one in these hearings, one that examines all the layers and says, let us start over, or unpeel some layers and look at what can be done in the future.

Just the combination of the environmental clean-up efforts and the 60 years of layers of micro-management are just bound to be at odds with what the most effective direction of the national labs should be, just bound to. Human nature should tell us that.

The chairman is exactly right to take a look at this and ask the question if we are greatly challenged for the near future in terms of jobs and our standard of living, how can the labs make their greatest contribution, and what should the governance structure be?

I am very interested in this and want to be a part of it. I have one question that I think has not been covered as much, so I have

heard. Let me ask this. Dr. Postma suggested that the university relationship with a lab is a good thing, not a bad thing. I used to wonder about that. Universities are not such well-managed organizations, by and large. I didn't know a university could be part of a partnership that met some of the more exacting requirements of lab management.

I would gather that the other part of that, the good part of the university involvement, goes to my question, which has to do with continuity. The university does have a culture and an attitude. I think of the distinguished scientists that we have at the University of Tennessee and the Oak Ridge Laboratory, with the State paying part and the Federal Government paying part, that has been wonderful for both institutions and good for the country, so you have that culture and the attitude and the opportunity for continuity.

My question is this: Rather than come to the end of 5 years and say, okay, this is all over, this contract, between the private manager and the Federal Government, if someone is doing well in managing a lab, could we not have another option? Could we not decide just to continue the contract for 5 years with minor adjustments, instead of going through a laborious renegotiation? Or could we introduce other elements into the relationship that would permit what is judged to be an outstanding relationship to continue, rather than to say, okay, that is done, let us throw it up in the air and start over again?

Dr. Postma?

Dr. POSTMA. Currently, DOE procurement rules allow for one extension of a 5-year extension. That doesn't mean they do it automatically, but it is sort of understood that if things go well, then there will be an extension of about 5 years.

One of the cases I pointed out, even though a contractor that I know that is doing well, DOE has decided to extend it 1 year. Nobody understands that. Nobody involved really understands why.

Senator ALEXANDER. Which example was that, Dr. Postma?

Dr. POSTMA. There is one at Oak Ridge with Batelle, as a matter of fact, in clean-up activity, a 1-year extension. It doesn't really make sense. They have been given a lot of kudos about how well they have done. Normally, I think—

Senator ALEXANDER. It got an outstanding rating, I believe, for that management, if I am not mistaken?

Dr. POSTMA. Yes. That is why no one understands. But the expectation is for one renewal of 5 more years. After that, it is almost a hard line about competition. Now, in essence, there is nothing to say that if you do well the second 5 years, why shouldn't you get 5 years more? Why does there have to be a hard line? Well, in part there is the old saying about, when you see the guillotine, it sharpens your mind a bit. If you really want that contract, you would be quite willing to compete for it again on that second term. A lot of contractors have said, oh, no. If you recompetes it, I'm not going to play. They always do end up playing, but they have lost a fair amount of activity in the process.

Some universities, to go back to that, don't pay or have not paid as hard attention to the contract-customer relations window as have some of the industrial contractors. I remember Martin Marietta's theme was, you'd better please the customer. There was

always, as a laboratory director, very important oversight by a board from the corporation that oversaw everything we did and asked terrible questions. You were part of those, I think. And we had to keep our guard up to make sure that we were doing exactly the right things.

Most universities are not quite that strong in their management of it. As a matter of fact, a few years ago the University of California president's office did a 5-year review of the directors of Livermore, and of Sig. I was part of that committee, along with a number of others, in trying to help them reach a judgment about that. That is a university way of doing things. They should be able to do that themselves, frankly. They should be enough on top of what goes on, on top of the management, and asking questions and participating enough in the key issues so they should not really require an outside review like they do of deans and Department heads, et cetera.

Generally, most universities don't do it. They do it the university way, which may be all right, but it is not a way that I personally think results automatically from some other kinds of contracts. That is my summary.

The CHAIRMAN. Let me change subjects for a minute and ask a couple of preliminary questions. First, are all of you familiar with the assessment process that the DOE takes on a regular basis and says—for instance, Sandia National Laboratories is given a rating because they have looked at them and they are given this evaluation. There is an evaluation that is the best evaluation, one not quite as good, one less good, and an evaluation that is pretty poor.

I am thinking that before we are finished with these hearings we have to find out a little bit more about that, because that kind of thing seems to me to create some very false hopes and some situations that seem terribly irrelevant. For instance, Lockheed recently was given a contract extension again, but you might know it was in the air that all these people were waiting to take it over. Of all the laboratories that the DOE had, it had the highest evaluation over a 10-year period.

Consistently, it was the best of all. Yet, it was going to go out to bid, while the rumbles were that Los Alamos is not going out to bid, and it wasn't the highest.

What do we do about that? Are those things of any consequence? Should we stop them? Are they valuable? If they are valuable, should they be used—how should they be used? Sig? First of all, do they do it right? Do you know how they do it? Maybe you have some observations.

Dr. HECKER. The current assessment process I believe was brought about when one of the contract modifications that you had indicated that has been made was a contract modification towards what is called the performance-based contract. Then the University of California put in place a self-evaluation process that utilized people from across the country to evaluate those programs. Then the Department of Energy was to make its final evaluation, taking into account the university's self-evaluation and then its own.

I believe that that process actually is the one that brings some hope to doing things right, because if the contractor and the labs understand what is expected, if that is put in the contract, and

then in the end it is essentially graded on that, that is the best overall assessment of performance.

Now, is it being done right? I think generally any of those things can be improved somewhat, but I think that is on the right track. It gets you away from essentially what I would call management by anecdote. That is that whatever the latest problem that crops up is, that actually determines your assessment, in the eyes of the government.

If you have an overall performance assessment, that should come into play. In the case of Sandia National laboratories, clearly there the records showed that it was doing what the Government wanted it to do. I think that is very valuable.

The CHAIRMAN. Doctor, let us make sure we understand the second part of that. At the same time you have told us today—I think you have said that you thought it was very good that Los Alamos was run by the University of California for 60 years, did you not?

Dr. HECKER. That is correct.

The CHAIRMAN. I think you told us that you were not so sure that the way it was given word that it was not going to get—next time around it was going to have to compete—it was not a very good process.

But you do know that for a while Lockheed was up for grabs, and finally, with a lot of people putting their oar in the water, it got extended, principally on the basis that they had been number one all along. Los Alamos was not number one. That rating system you referred to had placed Los Alamos in a less-than-superior position vis-à-vis the performance of other labs in their work. So why should Los Alamos should not have been graded on the basis that they were beginning to falter in terms of that evaluation? What is wrong with using that against Los Alamos?

Dr. HECKER. I think that is fair enough. I did not say that competition is a bad thing; I did say that competition is a good thing. If one has, you know, sufficient concern about whether the laboratory is actually doing its job, then I think one should examine that.

My own sense is—and I think I made that clear in my testimony—I believe we at Los Alamos are not as effective, not as productive, as we ought to be. That it is a combination of two things. One is, let's say, our own performance. Two is that we have a system of governance that in the end is broken. It is a combination of those two things.

The CHAIRMAN. Dr. Krebs.

Dr. KREBS. I agree with Dr. Hecker that the movement towards performance-based management and the interpretation of that in terms of the self-assessment process that DOE and the university undertakes, or actually any contractor now undertakes, actually has added—has improved the understanding of how the contractor manages, especially on the business side.

I think there is a danger that it could become too prescriptive, too detailed, and that is always something that I think one has to be careful about. If you trust each other, then you get to the right balance of at what level of detail you are going to ask for accountability.

Relative to Los Alamos and the question you just asked, my principle is this: In self-assessment, the laboratories are asked to make

a judgment about their business practice management and their program management. As I said in my testimony, I think technical excellence, technical judgment, has to be primary. Without that, there is no point in having excellent business management practices.

So the question I would ask is, you know, how is the balance there, not just the business management?

The CHAIRMAN. I want to close by asking you to each comment on this one observation that I have. Since I have been here, every time we have had a crisis with reference to the laboratories—let me just think to make sure I am saying this right—we have never had a crisis that said they are performing, in terms of their primary mission, poorly. The crisis was that they weren't doing something that some people thought they ought to be doing in exercising their mission quite right.

The big one is since we have been engaged with Russia so many years, the principal one has always been security. I wonder if you might just talk with me. Is it not possible that one could say that the laboratory's performance should be judged differently with reference to mission accomplishment as compared with some other aspects that are part and parcel of managing an institution?

Would one dare give Los Alamos back to the University of California if they are doing the absolute best work on nuclear deterrent and are found faltering in terms of security leaks and the like? How would you address that if you are coming up, now, with a new way of setting the prescription for contracts and the like? Either of you that have any feel for that, could you discuss it?

Dr. HECKER. If you don't mind, Senator, I would like to comment. It also makes me reflect back on your previous question about the way that the contract is currently being administered and judged. The performance-based contract actually is supposed to have this mission element in it, but as you just said, it never gets the play. If you go back and you look at our performance ratings on mission, they have been exceptional the whole time of the period that you discuss. So yes, of course the mission is the important thing. My great concern is that with the focus on these other aspects—which have to be done well—we have to do things safely, we have to be environmentally responsible—but we do have to conduct our mission. We have done that well.

I am concerned that the current process has driven us in a direction where the mission matters less and less. As you change out the contractors, what you are going to wind up doing is getting somebody that might be very efficient at doing the wrong thing.

The CHAIRMAN. Dr. Krebs.

Dr. KREBS. I would say something in my testimony to this effect. I believe that part of what has happened—first of all, I think that the management of security, particularly in a weapons laboratory, may not—may be more than simply business practices; it is part and parcel of the mission. Basically, you need—it does establish, then, a requirement on these laboratories to think about that in an integrated fashion.

Having said that—and I don't know from my experience—I don't know exactly what that right way to do it is. Having said that, what I observe, I believe, is that the Department has tended to

split off judging security management at these laboratories as a business practice, as something that is separate and apart from the mission, that can be described and prescribed in a way that allows you to make judgments independently of the mission. That is my comment.

The CHAIRMAN. Dr. Postma.

Dr. POSTMA. I'm going to differ a bit with my colleagues.

Just as in the corporate world you don't judge a CEO purely by how well they produce a certain product—it has to include accounting practices, it has to include ethics, it has to include a multitude of things—and we have known in the last couple of years how disastrous it can be to a corporation if not everything is attended to properly.

It is also true with a laboratory, that a really top-notch management will pay attention to everything that is important. Sandia is an example, in my mind, of one who has that balance in very good order. They have to pay very good attention to the mission, they pay very good attention to the security, to the employer relations, to diversity, to ethics, and to everything that is important in accomplishing a mission. So I don't see them as being all that separate.

If you have got great management, great management will take care of all of those things. The emphasis that the performance appraisals put on it can be misleading, but so long as you have got good management, they aren't going to be much different.

The CHAIRMAN. Dr. Peoples.

Dr. PEOPLES. I am not really qualified to speak about security, but let me look at a business practice, an impact thing. One of the things that sort of came out of the mixture of the Galvin report and what Secretary O'Leary did was adopting credit cards, all right? What this did is it allowed one to get rid of a large number, 95 percent, of all procurements. These were done primarily by clerks. Costs were saved. At Fermilab we were able to reduce the staff by 17 people.

But that process you understand introduces a risk. I am not sure the Department understands the balance between cost and risk. It is very important, because if you are going to do that, you have to expect a little of that. The way to judge it is to look at how much money was saved, how much money was lost, and compare those things. In a business, you would do that.

As I told you, I am genetically an accountant. I was brought up that way by my father who was an accountant, a famous one, and my brother. I understand that. That is what the Department does. Unfortunately, it is embarrassment that turns out to be the major quotient. We will get a new rule. I think the credit card thing was enormously successful, but one has to be prepared for something to go wrong, a little bit.

So \$120 million of procurements and a few hundred thousand dollars going wrong is not bad. Compare that to Enron, where 30,000 or 40,000 people lost their whole living. I'm going to disagree with Mr. Postma, this was pretty substantive in Enron. They were off-balance partnerships. That was nothing subtle, not like keeping track of credit cards; that was fundamental to the thing. I believe laboratories can take care of the fundamental business

performance, but the DOE has to be prepared to work with them to do it.

The CHAIRMAN. I want to close this, unless Senator Alexander has any more questions, by making this observation. Frankly, every time we have run into a major scandal, that is what we call it around here—either an accounting scandal or a security scandal, sometimes a combination of the two—we set about to set up a new order for things and we put in place some new Federal bureaucracy.

We thought that it was getting so bad and so obvious that we ought to pull the nuclear defense work out of the Department and put it into a semi-autonomous entity which we created. I was the lead person on it. We drew up a statute. We created it, NNSA. It has gotten to where some people remember it now, NNSA.

We just received a criticism that is going on this morning in the House that NNSA is not working. It was set up so we would not be setting up a new entity each time we had a crisis of security, but that this semi-autonomy would divest that part of the Department from some of the dysfunctionality that came with the overlapping of bureaucracy that ran both parallel and perpendicular to each other, running into each other. It has not been implemented. Either we didn't write it right, or they didn't implement it right.

What I have discovered, to my chagrin, is that Secretaries really don't want to get rid of the authority. So that NNSA has a hard time succeeding because it was intended that it be as crazy an idea as if the Secretary has too many strings attached, then the head of the NNSA should go rent a building somewhere else in town and move his whole operation elsewhere. That was said in open hearing by me that that is what the Director of the NNMA ought to do; that if they were too controlled by the Secretary, they ought to leave. It is not happening. In fact, it is getting closer. The latest report is that it is unsuccessful.

I have concluded that—Dr. Peoples summed it up. you would be a great manager to the extent that we were looking at anything to do with auditing, bookkeeping, credit cards, not because the contract of agreement between the U.S. Government and your laboratory was very much different than the contract with Dr. Postma, but because of who you are as a manager.

As a consequence, we are going to get great-managed laboratories if it is going to be, to a great degree, the quality of the management and not the details of the contract. But I am not sure that is going to be a good answer when we try to help the Secretary with some ideas about how the next Los Alamos contract should be entered into; although I would think we ought to have that very, very high on the list, that it is going to be important when you pick a company, an institution, an entity, that you know who you are getting to be the manager of the institution called Los Alamos.

Maybe my fond recollections of your early days and of the days that your prior predecessor—two predecessors, including the one I fondly remember, who was in fact only the second laboratory director of the whole laboratory; I knew him well—somehow it just seemed like we didn't have the problems of today. Maybe it is just the people; maybe it is just that we left them alone; maybe it is

that we've got way too many people that go in and look at every little detail. I don't know. But it surely is getting more difficult.

We have a situation at Sandia, to close this hearing, where you have just praised them heavily, and across the hall in the House there is a subcommittee hearing saying how terrible they have conducted their security work and how they have failed to respond to the contentions of Senator Grassley's office, even though an independent study by a former U.S. Attorney in New Mexico has said everything was fine. So it is really a pretty difficult situation with a lot of politics.

Senator Alexander, we can be assured that as we look forward to who is going to get Los Alamos, there will be more politics than we like in terms of how universities are going to qualify. I hope we can at least write that out as we set some criteria for them so that it won't—it really will be institutions that are going to give it high caliber, as it was when Sig joined them, or as the university was when Dr. Peoples joined it. I hope that is what we end up doing with Los Alamos.

Having said that, we are going to convene as scheduled. We thank you all very much for your time. We will pay close attention to your recommendations. Thank you.

[Whereupon, at 12:17 p.m. the hearing was recessed, to be reconvened on Tuesday, July 17.]

DEPARTMENT OF ENERGY LAB MANAGEMENT

THURSDAY, JULY 17, 2003

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:34 a.m. in room SD-366, Dirksen Senate Office Building, Hon. Pete V. Domenici, chairman, presiding.

OPENING STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. Senator Bingaman will be right along, I understand, and we're going to get started because there's a lot of things going on here and I'm afraid every minute we delay here risks our chance of hearing the witnesses today, so let us proceed, and we're going to take the witnesses—first, thanks to all of you, exceptional, powerful panel, great experience. I just hope that we can benefit from your thoughts and in turn pass on to the administration better ways to set management of these laboratories in place in the future.

We're going to start with Vic Reis, senior vice president of Hicks & Associates in Washington, D.C. This is the second in a series of hearings devoted to the Department of Energy's management of its laboratories—good morning, Senator Bingaman—and other facilities.

I want to start by thanking the witnesses for adjusting their schedules. For today's hearing we selected those whose careers and knowledge encompasses both the laboratories and at least one other major lab system. In their testimony and in our questions we will consider whether successful laboratory operations in another system, Federal or private, provides useful examples for improving the management of the DOE labs.

In future hearings we will hear from the leaders of some of the studies that have explored the productivity of the DOE laboratories and ways to increase productivity. In addition, we plan to hear testimony on the various contract models that are now used in the Department in the hope of exploring best practices that might be applicable.

Today, we have four of you, each with very important experience. Dr. Jack Gibbons served the Nation as President Clinton's science advisor from 1993 to 1998. Prior to his service, he directed the Congressional Office of Technology Assessment for over 13 years. He has also held senior positions with the Academy of Engineering

and the Department of State. He began his distinguished career at Oak Ridge National Laboratory in Tennessee.

Dr. Bill Spencer, I remember him when he first came as an aide to then Senator Buckley years ago, and directed some of the Nation's premier private technical ventures at Xerox—correct that, sorry. Dr. Bill Spencer, I'll come back to you in a moment.

Bill Schneider, chairman of the DOD Defense Science Board, and many other roles, including Under Secretary of State for President Reagan and the Associate Director for National Security at OMB, served for 10 years as a staff member in both the House and the Senate, and Vic Reis is currently, as I indicated, at Hicks. He served as Assistant Secretary of Energy for Defense Programs, Director of Defense Research and Engineering for the DOD, and in these and many other roles he's interacted with many other laboratories in DOD.

Bill Spencer directed some of the premier private technical mentors at Xerox, SEMATECH, and Bell Labs, senior manager of Sandia National Laboratory operations in both California and New Mexico, where he directed their microelectronics and systems development programs. He also has chaired a key part of the Galvin Study on the National Laboratories.

All right, with that, Dr. Gibbons. Dr. Gibbons, I've already introduced you, and indicated your background. We're delighted to have you here. We're going to proceed now. We'll start our testimony on this side with you Dr. Reis, and we'll move right on through, with Bill Schneider wrapping up this morning. Please proceed. The testimony from each of you will be made a part of the record right now, so we don't have to worry about it, and you abbreviate it as best you can.

Dr. Reis.

**STATEMENT OF DR. VICTOR H. REIS, SENIOR VICE
PRESIDENT, HICKS & ASSOCIATES, INC.**

Dr. REIS. Thank you for the opportunity to testify in this hearing. How our national weapons laboratories are managed is a critical national security issue. I have been involved with every type of government research laboratory for most of my career. I have worked in them, funded and guided them from various government positions, and have advised them, their parent organization, and the Government on how they should operate, so today I will briefly discuss what I have learned about lab management that might be useful to the current situation in the Department of Energy weapons laboratories and make a few specific recommendations.

I should add that the opinions I express are my own, and do not necessarily represent my employer or any of the organizations for which I consult.

Management begins with strategic planning, and the first question of strategic planning is to ask, what is the specific purpose of the organization? The purpose of any national laboratory is to attack a vital national mission that contains complex scientific and technical problems that can best be solved using large, integrated experiments and associated computations. Stockpile stewardship, the current primary mission of the national weapons laboratories is obviously such a mission.

Within the national lab complex, the FFRDC model of government-owned, contractor-operated facilities has proven to be the best operational model. FFRDC's have an inherent and significant operational flexibility and advantage over an equivalent government-owned, government-operated facility. The DOE weapons laboratories are FFRDC's and should remain so.

So what is the problem with the management of the DOE weapons laboratories, and how might they be fixed? Dr. Sig Hecker hit the nail on the head in testimony to this committee on June 24, when he concluded that the root cause of management difficulties at the DOE weapons laboratories is a lack of trust between the Department of Energy and their laboratories.

However, I do not subscribe to Sig's recommendation that a blue ribbon panel should be created by the Congress to solve the DOE weapons management issue. You don't establish trust by blue ribbon panels, any more than you build trust by inspection, security and safety rules, audits, and external reviews, even though all these items are essential to good management practice. We all know from a lifetime of personal experience that trust is developed from a shared sense of values and working together as a team toward a common goal.

Dr. Hecker points out that after the cold war ended the DOE was not sure what they wanted the weapons laboratories to do, other than stop testing, downsize, and help U.S. industry, but that uncertainty ended with the creation of the stockpile stewardship program, and while it took a few years for stockpile stewardship to catch on, stockpile stewardship is now a core mission for the DOE and the weapons laboratories. Indeed, Congress recognized this by creating the National Nuclear Security Agency, NNSA.

When I joined the DOE back in 1993, there was a deep cultural divide between the DOE managers and their laboratory counterparts. My approach to closing this breach of trust was to install senior folks with extensive laboratory experience as my operational deputies and give them the freedom to lead. Because of their lifetime accomplishment at the labs, the labs trusted them, and because of their obvious management expertise they soon developed a similar trust among the key DOE staff. Working together, the labs and defense programs collectively developed stockpile stewardship. Since I believe DOE lab trust will be an issue in the foreseeable future, I would recommend this practice be continued and extended by assigning a significant number of DOE personnel to labs to participate directly in programs.

My second recommendation has to do with the use of boards of directors at FFRD's. The DOE's Lincoln Laboratory provides an example of an effective use of a board. Lincoln uses a joint advisory council, JAC. The director of Defense Research and Engineering, the DDR&E, who is joined by the senior managers of the services, DARPA, NRO, and the BMDO, shares this council.

The function of JAC is to provide the strategic discipline to ensure that the lab is working on those national problems that fit the lab's talents and mode of operation. Every JAC member has a critical stake in the lab's success and long-term well-being. Trust is maintained at the executive level. One can imagine an analogous board for DOE weapons laboratories, including not just the defense

programs, but the NNSA, the DOD, other parts of the Department of Energy, Homeland Security, and the National Security Council.

Finally, let me comment on the impending competition for the Los Alamos and possibly Livermore National Laboratories. Given all the issues whirling around the labs, I am for it. I do not believe that new management is necessary to improve outmoded business practices, or safety, or security. Pete Nanos and Mike Anastasio can do that very well, thank you. But I think this competition can be used to refocus the labs on their mission, and to continue to sharpen their strategic vision.

If it is done effectively, it will require the DOE to fashion a request for proposal that focuses on how well the potential management team, their contractors, rather, can deliver on their mission, not just how well they can count paper clips. I would add that I believe it is vital to have a great research university be central to the management of these laboratories, not because of any particular management expertise, but because only a great university creates a culture of scientific learning, and scientific learning is critical to science-based stockpile stewardship. If it's location, location, location in real estate, it's mission, mission, mission in national laboratories.

Mr. Chairman, I would be remiss if I missed an opportunity to thank the members and staff of this committee, and you in particular, for all your help during my stint at the Department of Energy and, more important, for your extraordinary service to our Nation and to the world at large.

Thank you very much.

[The prepared statement of Dr. Reis follows:]

PREPARED STATEMENT OF DR. VICTOR H. REIS, SENIOR VICE PRESIDENT,
HICKS & ASSOCIATES, INC.

Mr. Chairman, thank you for the opportunity to testify in these hearings. There are few things more important to national security than the viability of our national weapons laboratories and how they are managed is critical to their success.

As you can see from my biography, I have been involved in laboratories most of my career: private industrial labs, government labs and Federally Funded Research & Development Centers (FFRDC's). I have worked in them, funded and guided them from a variety of government positions, and advised them, their parent organizations and the government on how they should operate. So today I will briefly discuss what I have learned about lab management that might be useful to the current situation in the Department of Energy and the weapons laboratories in particular. I should add that the opinions I shall express are my own and do not necessarily represent my employer or any of the organizations with whom I consult.

Management begins with strategic planning, and the first question of strategic planning is to ask what is the specific purpose of the organization? The purpose of any national laboratory is to attack a vital national mission that contains complex scientific and technical problems that can best be solved using large, integrated experiments and associated computation. Stockpile stewardship, the current primary mission of the national weapons labs, is obviously such a mission.

If the job to be done can be done better, or even equally well, in academia or private industry, academia or private industry should have preference. Government-owned laboratories should not compete with private industry or academia.

Within the national lab complex the FFRDC model of government-owned, contractor-operated facilities has proven to be the best operational model primarily because of the inherent and significant operational flexibility advantage that an FFRDC has over an equivalent government-owned, government-operated facility. The DOE weapons labs are FFRDC's and should remain so.

So what is the problem with the management of the DOE labs, and in particular the DOE weapons labs? And how might they be fixed?

Dr. Sig Hecker diagnosed the DOE lab management problem in his testimony to this committee on June 24th. Sig hit the nail on the head: the root cause of the management difficulties (and they are real) is the lack of trust between the Department of Energy and their laboratories. Dr. Hecker provided numerous, poignant examples of how that mistrust developed. But with all due respect, I believe, Sig's recommendation that a Blue Ribbon Panel is required to solve the management issues is not one I would subscribe to. You don't establish trust by Blue Ribbon Panels, any more than you build trust by inspection, security and safety rules, audits, and external reviews, even though all these items are essential to good management practice. We all know from personal experience that trust is developed from a shared sense of values and a common goal, and working together to reach that goal, no matter how difficult it is and how long it takes.

Dr. Hecker points out that after the Cold War ended, the DOE was not sure what they wanted the weapons labs to do, other than stop testing, downsize and help U.S. industry. But that uncertainty ended with the creation of the stockpile stewardship program, and while it took a few years for stockpile stewardship to catch on, there is no doubt now as to the centrality of stockpile stewardship to the DOE or the weapons labs. Indeed, Congress recognized this by creating the National Nuclear Security Agency (NNSA).

I was faced with this "trust" problem in spades when I joined the DOE back in 1993. There was a deep cultural divide between the DOE managers and their laboratory counterparts. My approach to solving the problem was to bring in senior folks with laboratory experience to become my operational deputies. Because of their lifetimes of work experience at the labs, the labs trusted them. And because of their obvious management expertise, they soon developed a similar trust among the key DOE staff. Working together through ups and downs, we collectively developed stockpile stewardship. While this practice raised some eyebrows within the DOE, it is my strong belief that this step was absolutely key to getting stockpile stewardship off the ground.

Since I believe DOE/lab trust will be an issue for the foreseeable future, I would recommend this practice be continued and I would further recommend extending this practice by assigning a significant number of DOE personnel to the labs, to participate directly in programs.

My second recommendation has to do with the use of "Boards of Directors" at FFRDC's. Lincoln Laboratory provides an example of an effective use of a "Board." Lincoln uses a Joint Advisory Council (JAC) which is chaired by the Director of Defense Research & Engineering (DDR&E) and who is joined by the senior R&D managers of the Services, DARPA, NRO and the BMDO. It brings real value added to the operation goals are shared and priorities chosen. Most important, it provides a strategic discipline ensuring the Lab is working on those national problems that fit the lab's talents and mode of operation. Everyone on the JAC has a critical stake in the lab's success and long-term well being. It is not too hard to imagine an analogous board for the DOE weapons labs, including not just Defense Programs, but the NNSA, the DoD, other parts of the DOE, Homeland Security and the National Security Council.

Finally, let me comment on the impending competition for the Los Alamos and possibly Livermore National Labs. Given all the issues whirling around the labs, the DOE and the international situation, I'm for it. Not because I believe that new management is necessary to improve outmoded business practices, or safety or security—Pete Nanos and Mike Anastasio can do that very well, thank you—but because I think this competition can be used to refocus the labs on their mission, and continue to sharpen their strategic vision. If it is done effectively, it will require the DOE to fashion an RFP that focuses on how well the potential management team contractors can deliver on the mission not just on how well they count paper clips.

I would add that I believe there is significant value in having a great research university be integral to the management of these labs. Not because of any particular management expertise—what university ever built a plutonium factory—but because the university creates and sustains a culture of scientific learning, and that is truly what science based stockpile stewardship is all about.

Mr. Chairman, I would be remiss if I missed the opportunity to thank the members and staff of this committee and you in particular for all your help during my stint at DOE, and more importantly your extraordinary service to our Nation and to the world at large.

The CHAIRMAN. Thank you very much.
Dr. Spencer, please proceed.

**STATEMENT OF DR. WILLIAM J. SPENCER,
CHAIRMAN EMERITUS, INTERNATIONAL SEMATECH**

Dr. SPENCER. Thank you, Senator, and I appreciate you and Senator Bingaman inviting me to participate in this and to comment on the governance of the national laboratories. I'm going to focus on the weapons labs. That's where I think I know a little bit, and not a lot in the other areas.

I have the highest regard for these institutions and the people who have been there. I think they're dedicated, and the service they have rendered to the Nation is something we all deserve to give them a vote of thanks for.

As you know, my career has been entirely in the entire private sector. Even when I was at Sandia I was a Bell Labs employee assigned to Sandia for a number of years, so the views I'm going to give you today, the biases which you're going to hear from me, are influenced by a career in the private sector, things I learned at AT&T and Xerox and later at Sandia and SEMATECH.

I read the previous testimony and your comments after that. Some of the things I'm going to say today you've already heard. I'm going to try and focus on those areas where I know a bit and give you some recommendations and hopefully some ways maybe to implement some of those recommendations.

I strongly believe that the better management of the weapons laboratories can be done by private corporations. This was earlier said by Herman Posner, and I agree with his assessment on that. However, believe that the current GOCO system is broken, and is broken, it seems to me, for two reasons. One is changes in the Government. You've heard a lot about that over the last sessions and I'm not going to talk much about it today, but the other is the changes that have occurred in industry.

Many of the problems which you've heard were identified in the study we did in 1994 or 1995 on alternatives for the future of the DOE national laboratories, the Galvin report. I was chair of the national security section on that, looking at the weapons labs, and I think the issues that were identified then are still there today, and perhaps they're even worse, but how about the private sector? I'd like to go back for a minute and look at the start of the Bell System and their management of Sandia in the late forties.

You probably remember that President Truman asked Mervin Kelley, who was the president of Bell Labs at that time, how the AEC facilities should be managed, and Kelley said, let's do it with private management, but don't include AT&T. You remember, Mr. Truman was able to convince him that it was a good idea for the Bell System to take over the management of Sandia, and I think that was a successful collaboration from 1949 to 1989, 5 years after the breakup of the Bell System, and at the time that AT&T dropped out of managing Sandia. All the reasons for their joining and then dropping out you know better than I do.

However, if we look at companies today, AT&T doesn't exist as it did in the late forties, and all of the companies in the United States have changed dramatically since the late forties and the fifties. We came out of the Second World War with preeminent companies on a worldwide basis. We had very little competition, and that doesn't exist today.

Companies like AT&T, which had very large in-house research laboratories, either have closed those labs or restructured them or redirected them so that the focus today is on much shorter term projects. Even the laboratory which I was a director of for many years, which has been given credit for developing a lot of the personal computer effort, Xerox's Palo Alto Research Center, has been spun out as a separate company. It's no longer an internal research lab for Xerox.

Now, with these changes, how are you going to get U.S. corporations to come in and be willing to direct or manage national laboratories, and especially the weapons laboratories? I believe you're going to have to think about a whole new set of incentives. If you look at U.S. corporations today, the things that they compete with are getting the best talent, intellectual property, and determining a market which they can get into to use these capabilities for an advantage in a global situation, competition that they didn't have in the past, so it's essential, I think, to get these companies to tell you what they need to get into, to get into management of the weapons laboratories.

I agree with Vic that a board of directors as an oversight is the right way to go for these companies. However, I would make that a hard-nosed, knowledgeable, involved set of business people with very few representatives from the Government or the company that's managing a particular facility.

I think when we went back to set up SEMATECH in the mid-eighties we had two studies. One was done by industry, led by Charlie Spork. One was done by the Defense Science Board, led by Norm Augustine. Those two studies looked at what it would take for industry to help solve the semiconductor problem in the mid-eighties. Norm Augustine looked at what the Government wanted. After those two studies were done, they got together and formed SEMATECH, which many of you have been involved with, and you know as well as I do what it did and what it didn't do.

I thought it was a good model, and one we might consider as we look at management for the weapons laboratories in the future.

Thank you.

[The prepared statement of Dr. Spencer follows:]

PREPARED STATEMENT OF DR. WILLIAM J. SPENCER, CHAIRMAN EMERITUS,
INTERNATIONAL SEMATECH

These notes and my comments on July 17, 2003 are focused on governance of the three DOE Weapons Laboratories; Los Alamos National Lab, Lawrence Livermore National Lab and Sandia National Lab. The primary mission of the three laboratories, as I understand it, is the maintenance of a safe, secure and reliable nuclear weapon stockpile in the absence of testing. This mission has not changed over the last several years and is of great importance to the nation. The performance of these three laboratories over the previous decades was a major factor in the successful conclusion of the cold war and the current and former members of these organizations deserve a vote of thanks from a grateful nation. Every effort must be made to insure the success of their mission in the future. This is especially true in the area of governance.

The attention of Congress to maintaining effective governance of these key national resources is to be commended and I am appreciative of the opportunity to comment.

These notes and my comments are certainly biased by my experience. I had the opportunity to work at two of the world's premier research laboratories, Bell Labs and Xerox' Palo Alto Research Center, serving as the Director of the latter. Also, as the Director of Microelectronics and Weapon Systems at Sandia National Lab

and as the Chief Executive of SEMATECH. In 1994-5, I was the chair of the National Security portion of the study for the Secretary of Energy on "Alternative Futures for the Department of Energy National Laboratories". Many of the recommendations of that study, chaired by Robert Galvin of Motorola, are applicable to the governance of the Weapons Labs today.

The recommendation that I will propose and hope to substantiate is the three laboratories are better managed by private organizations, with proper incentives and minimal government oversight. This was the situation three decades ago and a return to something similar to that mode of management is in the best interests of the country. However the current GOCO process is broken and must be replaced.

It may be informative to look briefly at the history of the Bell System involvement with the management of Sandia Labs as one successful example. These are personal recollections. There is a complete history of the establishment of Sandia Labs, the involvement of Mervin Kelley, the President of Bell Labs in the late 40's, and the recruitment of the Bell System to be Sandia's first managers. President Truman had asked Kelley to chair a study to determine the management of the Nuclear Weapons program of the Atomic Energy Commission (AEC). Kelley recommended private management (the GOCO model) and Truman convinced AT&T to take the responsibility for Sandia over the companies' early reluctance.

This arrangement continued until 1989, five years after the break-up of AT&T into multiple companies. The arrangement had several advantages for Sandia and the Government. First, AT&T accepted the responsibility for no fee and was extremely vigilant about insuring that no government funded technology was returned to AT&T. Second, AT&T supplied a series of excellent senior managers principally from Bell Labs and Western Electric. Most of the individuals were on an assignment to Sandia for a few years and returned to executive positions within AT&T. Additionally, Sandia was able to obtain access to new technologies from AT&T, especially from Bell Labs, of importance to its role in the nuclear weapons program.

One example of technology acquisition occurred in the mid 70's, when a facility for designing and producing small quantities of radiation-hard silicon integrated circuits was established in Albuquerque. The design software and early semiconductor processes were based on Bell Labs technology. Sandia provided the radiation hardening capability. The transfer of technology was enhanced by the assignment of several key technologists from Bell Labs to Sandia. This exchange of personnel, both management and technical, was a benefit to the Government. The Bell System individuals were often those destined for broader responsibility upon their return.

The importance of exchange of personnel cannot be over emphasized. The successful realization of the mission of any organization ultimately rests on the few key employees of that organization. It is usually not possible for any organization, public or private, to hire all of the talent that it needs to meet its mission. The Bell System was rich in talent and could share personnel without jeopardizing its own success. The choice of a future management organization should consider the availability and willingness of that management organization to share key personnel.

This has not been the situation in the two University of California managed laboratories and I think to the detriment of those laboratories. It appears to me that the exchange between Sandia and its management partner today is lower than with the Bell System, particularly with regard to technical talent.

Are there issues with the current situation in the management of the three laboratories? There have certainly been many high-lighted in the recent press. These seem to be symptoms of a major problem and not the problem itself. The underlying problems identified by the 1994 study of the DOE National Laboratories are still there and perhaps even more serious today than a decade ago. These are detailed in the 1995 report and deserve being reviewed. Some of the major issues raised were: high overhead costs, too much focus on compliance, a scramble to establish "new mission" areas, lack of good business practices and one too many nuclear design facilities. Most importantly, the principal problem identified was "the micro-management of the laboratories by Congress and the excessive oversight by the Department".

This has led to what I would call the "Photon Model of Management" of the Laboratories. You may recall that a photon is a small packet of energy with wave-like characteristics. It is usually formed by action within an atom or molecule, then the photon travels at the speed of light until it is absorbed by another atom or molecule. Traveling at the speed of light between collisions (or meetings) means that time elapsed on the photon between these events is zero, there is no time between collisions. The same thing is occurring with management in the laboratories. There is zero time between meetings (or collisions), meetings usually called by Congress or the Department and often requiring several pre-meetings to prepare for this often redundant review. Thus for senior management, and usually cascading throughout

the organization, there is zero time for contemplation, or strategic thinking or long range planning. I do not believe this is in the best interest on the nation. The problem will only be resolved with the installation of competent management and the establishment of trust with Congress, the Department and the Nation. This means choosing an organization with the talent and motivation to perform this important task. It cannot be resolved by additional Government constraints on the laboratories.

Do such organizations exist? Are they in the private sector or elsewhere? My bias is that the private sector is best qualified to manage the laboratories with an involved and knowledgeable Board oversight. Making this choice will mean private levels of salary and other benefits for the laboratory employees. For the current mission, the surety of the nuclear weapon stockpile, the better choice would be a private US corporation. It might also be possible to find the right person to head the Weapon Laboratories and to have an oversight Board made up of representatives from several of the US's leading companies to advise and evaluate that individual and his/her team. The particular choice of a corporation(s) should depend on the details of the mission of the laboratories. How important is research versus development or production of weapons? What sort of management and technical talent are required? Is it available and will it be shared? Answering these questions may require an appropriate in-depth study. However, there are some guidelines on how to identify and motivate private organizations to take up the task. The key will be finding the right leader, giving that person and his/her team the freedom to manage the laboratory for a period of five years with proper private Board oversight and judge the success or failure by results. This might be considered an experiment in a completely new way to manage the Weapons Labs and ultimately other GOCO facilities.

In my view, the model of the Bell System management of Sandia is the better of the known models for government laboratories. AT&T was a corporation with a large and prestigious in-house research organization and broad business experience and knowledge. There is not a counterpart to AT&T today and other US corporations have undergone major change since the late 1940's. Therefore the proposal to consider a consortium of companies to be involved in the management of the Weapon Lab if a single corporation is not found. The change in US corporations is due in some part to government actions and in other cases loss of a monopoly position or global competition. There is a bright side to this global competition in that managers of global corporations develop talent that make them better able to handle difficult and complex situations that are inherent in the DOE labs today. Global competition usually also leads to slimming down employment and companies with large talent pools are rarer today. Therefore, a method must be found to locate or expand promising corporations with the appropriate resources that might be candidates to manage the three laboratories.

Appealing to patriotism may not have the same effect as 60 years ago. US corporations are often in a battle for survival. Giving them opportunities to improve their competitiveness would be a better incentive. Access to better or more talent, new ideas, longer range research or a level playing field with respect to their foreign competitors would be attractive. The better incentive would depend on the company and its market. Convincing any company that the government can be a good partner will be difficult.

An example of a successful partnership between Government and industry is the initial formation and operation of SEMATECH. The funding and structure of SEMATECH was the result of independent studies by both Industry and Government. As a result of these studies, the Government supplied money and some minimal oversight and left the management and direction of the consortium up to the private sector. This cooperation lead to the consortium meeting its goals and the ultimate withdrawal of government funds after the US industry regained market share. The result was characterized by the GAO "as an example of private management of government money to the benefit of both". Certainly the management of the nuclear weapon stockpile is of greater importance than national market share in a technology. A method to give responsibility to the private sector, perhaps modeled on earlier successes, to properly manage government funds can be found.

A summary of the recommendations;

- Insure that the surety of the nation's nuclear stockpile is the primary mission of the three laboratories;
- Focus on private corporate management of the weapon laboratories, either a single corporation or a consortium;
- Completely eliminate the current management and oversight policies;

- Treat the management of LANL or the next Weapon Lab to be competed as an experiment to be judged by agreed upon results in five years;
- Initiate discussions similar to that used to set up SEMATECH to determine the details of Weapon Labs management; what industry wants, what the government wants.

The CHAIRMAN. Thank you, Dr. Spencer.
Dr. Gibbons, nice to have you here.

**STATEMENT OF DR. JOHN H. GIBBONS, PRESIDENT,
RESOURCE STRATEGIES**

Dr. GIBBONS. Senator, I appreciate it very much. I spent a little over 3 hours this morning coming 45 miles, so I think when I was told, why don't you retire and slow down, I did this morning, but not of my own volition. Thank you for letting me in the door. I'm sorry I'm late. I had intended to get here about an hour early to prepare a timeless 2-minute summary, but since I got here so late, it's going to be shorter and not so timeless.

I think we all understand that scientific research and the merging of disciplines is probably the greatest hope for the future of any industrial country. It becomes more so with the passing days, and the link of that process of research and technology development to higher education is also a terribly important activity. Both of these fit, I believe the kinds of activities that the national laboratories and the kinds of resources we have there which we should be constantly moderating and changing to meet the new opportunities and needs.

Clearly, DOE is an energy laboratory in its manifest ways, but energy is also about as ubiquitous an issue as we can think of in this world, so we need many disciplines, disciplines that not only are excellent, but know how to work with each other, speak each other's languages, focus on the same problem from different perspectives, as was so eloquently stated by Harold Varmus when he talked about the need for all kinds of science and engineering in order to do medicine.

One of the things I have problems with, and you have my vitae before you, so you know I've been in these laboratories in a variety of ways, is that I've always been worried about the growth of layering of administrative oversight over the years. What began as probably a reasonable thing in the forties and fifties, it seems to me must be seen as more than a little anachronistic these days, and so we find an issue before us not so much of a good science and good technology coming from these laboratories, but the layering of administrative oversight that can confuse the researchers and, I believe, not be the best use of resources. I believe that needs continuing work. It's not as though it was bad, but it's getting worse all the time, because we're not changing with the needs.

Another need is an increasing focus on devising partnerships in order to solve problems, partnerships that reach between the laboratories. For example, there was an excellent partnership developed in the DOE labs in designing and constructing the advanced neutron source in Oak Ridge. Several laboratories were deeply involved in that process, and it has worked beautifully by combining those resources. The whole is greater than the sum of the parts.

Another example is the work between the National Renewable Energy Lab and Oak Ridge on biomass and energy from biomass

resources, whereas the best of the capabilities in these two labs have been merged in a virtual laboratory, so the freedom of moving between the laboratories in terms of the division of the work, and the construction of solutions, is a very important need.

That reflects on the way we need to think about administering these labs and fostering this kind of interaction, rather than the natural proclivity to move towards relative isolation one from the other. Even within DOE I get a sense that some parts of DOE feel that this lab is theirs, and that lab is someone else's, and that's not good. That's not productive.

Partnerships that go beyond the work between the laboratories, between DOE and other Federal laboratories is important, and also between, of course, the DOE laboratories and industry. In the work we did in the nineties on the partnership for a new generation of vehicles the DOE labs formed a virtual partnership by the directors. I think it was six of those labs. Their people began to learn much more intimately the language of their own counterparts in science and technology in the automobile industry, in the automotive industry. They began to speak each other's language and understand the different perspectives. That led to much more productive ways of both the industry and the laboratories working together.

So we have an imperative for a measure of leadership and management that understands these emerging and growing needs in the way they not only run the laboratories and encourage these kinds of interactions, but also in the way the laboratories' progress is judged, and the way the capabilities and progress of the people is judged.

I would only add that I think the national labs, the DOE's labs are extremely important. They have been time and again judged as being outstanding national resources, and we must be careful not to get so overfocused on administrative problems that we lose sight of those jewels that are out there that are constantly in need of encouragement and support.

That means that we should hearken back to Senator Dirksen, who once said—Senator Dirksen said, I'm a man of principle, and my first principle is flexibility, so I think we should face the future of these laboratories' management in the same way. We must have principle, but also be flexible in the way we move to the future.

Thank you, sir.

[The prepared statement of Dr. Gibbons follows:]

PREPARED STATEMENT OF DR. JOHN H. GIBBONS, PRESIDENT,
RESOURCE STRATEGIES

Mr. Chairman and Members of the Committee:

I am pleased to appear before you today and appreciate your invitation for me to share my perspective on management and support of science and technology in the nation's interest. It has been said that education is the progressive discovery of one's ignorance. I've been involved with physics, energy, and environmental studies at various national laboratories for fifty years, so that amount of "education" has left me knowledgeably ignorant about the issues you are addressing. I won't belabor my personal record but do want to be explicit about my background and current connections. For your information I presently serve as consultant to the Lawrence Livermore National Laboratory and the National Renewable Energy Laboratory.

After my Ph.D. and post-doc work in physics at Duke University, I joined the Oak Ridge National Lab (November '54) and enjoyed many years of research in nuclear structure, including many interactions with colleagues at Los Alamos National Lab-

oratory, Argonne National Laboratory, and Brookhaven National Laboratory. Other than expected differences in security constraints I perceived little difference in the administration, quality of work, or mode of working among these four labs. The labs had developed a separate institutional culture that seemed to be semi-independent of the particular contractor/operator. I recall one incident at a social function in Oak Ridge where I challenged an official about paucity of the contractor's attention to the community's needs in the arts, recreation and economic development—whereupon he responded, “. . . if you don't like working for 'x' corporation then you can go find another job. . . .” I instinctively responded that “I don't work for 'x' corporation, I work for the Oak Ridge National Laboratory.”

This incident highlights the challenge of organizational management—how to be a part of the organization while also exercising wise management by maintaining the critical condition of being apart from it. Frequent change of management (philosophy, mode of administration, . . .) can be disruptive and counterproductive, often resulting in poorly performing service contracts. On the other hand, without enlightened and innovative management an organization can become stagnant and sloppy over time—especially in the absence of the discipline of the marketplace.

A second theme I encountered was the sense of “layering” of administration of the labs between Agency Headquarters, Field Operations Offices, and lab management. I understand the original rationale for this way of doing business, but without clear demarcation of responsibility and authority I was persuaded many years ago that administrative streamlining remains an important opportunity.

A third theme is that the culture of a basic research organization can be quite different from one engaged in advanced development and production. The profound success of AT&T Bell Laboratories reflects the power of successfully intertwining the two, but it requires special circumstances to enable it to work. For the U.S. Department of Energy and other mission-oriented federal agencies, this presents a great challenge: how to simultaneously do world class research relevant to DOE's mission, connect effectively between research and application, and work effectively with academia, sister labs and private industry. The multi-agency, public-private sector work initiated in 1993 under the Clinton-Gore Administration's PARTNERSHIP FOR A NEW GENERATION OF VEHICLES (PNGV) made important strides in learning how to effectively address highly complex socio-technical challenges by marshalling and integrating the collective R&D assets toward a common national purpose. With the Department of Energy, the national laboratory directors formed a PNGV virtual partnership to maximize their contributions rather than focus on competing with each other for projects. Similarly, the division of labor among the national labs in design, development, and construction of the Advanced Neutron Source accelerator has been sensible and highly meritorious.

A lesson from this experience is that the managers of the labs need to treat such collaboration as vital in making the “whole greater than the sum of the parts.” Measures of success of labs need to include such activities as these in addition to more traditional measures of efficiency and progress called for under the *Government Performance and Results Act (GPRA)*.

Mr. Chairman and Members of the Committee, I believe that science and technology are absolutely essential in addressing today's needs and providing options to enable the kind of future we seek. The various U.S. agencies have a rich experience in organization and management styles; so does the private sector. In the case of DOE, I believe that the different organizational modes being used—GOCO, FFRDC, GOCO, and Reserve Contracts to universities and industry—all have demonstrated successes. The choice of management model should be matched to the nature of the work intended to be carried out. Continuation of a contractor should be judged on output performance, and this inherently requires a long-term perspective. In all cases it is imperative to have periodic peer reviews, not only of the quality of R&D but also of its relevance to national interest.

Finally, there are other lessons to be learned from experiences at government agencies such as NSF, NIH, EPA, and NASA. It is their collective experience as well as that of research-intensive industry that we should seek and apply. Different agencies require different R&D management structures, but there is much in common, and there is increasing need to integrate their work, especially in energy, health, the environment, and national security.

It would be great if the U.S. Congressional Office of Technology Assessment were still around to help the appropriate Congressional committees sort this out. Sadly that is not an option. Perhaps the National Academies or the President's Committee of Advisors on Science and Technology could assist in devising a thoughtful and independent assessment of science and technology management. For anyone undertaking an assessment of this important issue, I recommend a careful reading of

John W. Gardner's monographs on Excellence (1960) and *Self-Renewal: The Individual and the Innovative Society* (1964).

I would be pleased to respond to your questions.

Thank you.

The CHAIRMAN. Thank you very much.
Bill Schneider.

**STATEMENT OF DR. WILLIAM SCHNEIDER, JR, CHAIRMAN,
DEFENSE SCIENCE BOARD, DEPARTMENT OF DEFENSE**

Dr. SCHNEIDER. Thank you, Mr. Chairman, and it's a privilege to have an opportunity to be here. I am Chairman of the Defense Science Board, which was founded in 1956 as a Federal advisory committee, and the Defense Science Board has been particularly concerned about the health of the technology base and the institutions that support that technology base, and my testimony goes into some detail about some of the prior Defense Science Board studies, and with your permission, Mr. Chairman, I have three of these studies which I'd like to provide to the committee for use, and I'll include them with the full text of my testimony.

The CHAIRMAN. We'll be glad to accept them.

Dr. SCHNEIDER. Thank you.

What I will focus on is more narrowly what I believe to be the near-term lessons from some of the DOD experience on the management and governance of its laboratories that might be pertinent to this committee's considerations of the governance of the DOE national laboratories.

The cold war era division of labor between the DOD laboratories that serve defense needs and the laboratories of the nuclear weapons complex that uniquely serve that specialized requirement no longer reflect the reality of the 21st century. The national security laboratory structure of the U.S. Government, to include those that are funded within the budget function 050, NASA, the DOE, and NSA laboratories and DOD, need to be considered in a more holistic manner to optimize their ability to support U.S. national security, rather than as individual entities of these agencies. The institutional barriers, especially between the Department of Defense and the DOE NNSA laboratories, are a particular burden on the ability of the national security science and technology sector to make the best use of the aggregate resources made available through appropriated funds throughout the Federal Government. In the category of work for others, which is the area where the national laboratories do work for other agencies, including the Department of Defense, they do nearly \$1 billion worth of work for the Department of Defense, but my testimony has a number of specific examples of how this reflects an underutilization of the capacity of these laboratories, and I've suggested some specific measures for reform, which I won't go into now.

I would like, however, to draw some of the lessons DOD has learned, particularly about laboratory governance, that may be pertinent to modernizing the governance in the national laboratories. The DOD provides R&D services to the military departments and defense-wide institutions through a variety of institutional forums, including civil service laboratories, federally funded research and development centers, university affiliated research centers, govern-

ment-owned contractor-operated, and many others. Many of these have been highly successful for decades, while others have enjoyed a period of success followed by a decline in performance over time. For purposes of illustration, I will focus on one form of institutional governance, FFRDC's, and some of the observations that have emerged from the DOD's experience.

The Federal Government currently supports 36 FFRDC's in the field of aviation, defense, energy, health, space, and tax administration. The DOD sponsors nine of these FFRDC's. These organizations support the DOD in scientific research, systems development and acquisition, and related tasks. They are organized as independent, not-for-profit entities.

A defense Science Board Study of the FFRDC's in 1997 affirmed their value to national defense, and identified four characteristics that accounted for their success. First, they have unique competence and quality, second, the FFRDC's are closely integrated with their sponsor, third, they adhere to strict constraints to minimize institutional conflicts of interest and to promote objectivity and to ensure independence from interests that may conflict with sponsor interests, and fourth, the FFRDC's maintain a continuity of relationships sufficient to establish a corporate memory in topics of critical interest to the sponsor.

Two of the nine FFRDC's are also associated with a university. One of these university-affiliated FFRDC's, MIT's Lincoln Laboratory, which Vic Reis mentioned, is among the oldest of the FFRDC's, and recently celebrated the 50th anniversary of its founding. In this respect, it is perhaps the closest parallel to the NNSA labs that are associated with the university, in this case the University of California laboratories of Los Alamos and Lawrence Livermore Laboratory.

There are two important distinctions between the DOD experience with university-affiliated laboratory governance and the DOE/NSA practice pertinent to this committee's inquiry. The first pertains to the relationship between the laboratory and the user. The linkage between Lincoln Laboratory and the user committee is both direct and very close. Vic Reis commented on the closeness of this in the supervision from their advisory body.

There is very little intermediation and micromanagement by the administrative apparatus of the Department of Defense between the laboratory and the users of its services. The university environment provides an environment where human capital can be developed and accessed by the laboratory, assuring a strong cadre of professionals conversant with the most advanced technology in the laboratory's sphere of responsibility as an FFRDC. A user committee, Lincoln Laboratory's Joint Advisory Committee, provides close coupling to the user.

The second aspect is the relationship between the laboratory and the university itself. Lincoln Laboratory has an extremely close relationship with the university, in this case MIT, in physical, intellectual, financial and managerial terms. This close relationship creates a virtuous circle that produces a high quality professional staff and intellectual output as well as close supervision of the laboratory by the university on fiscal and safety matters. The DOD prac-

tice contrasts sharply with the two DOD NNSA university-affiliated national laboratories.

Extensive fiscal, contractual, security, and administrative requirements of both agencies are cascaded down to the laboratories, often overwhelming the university presence. The relationship for the ultimate user is indirect, and filtered through both organizations. This practice diminishes the benefits of the university affiliation, since day-to-day relationships with the two government agencies dominates the process of executing the contract with the university.

Moreover, the dominant role of the two agencies and day-to-day operations of the two laboratories prevails over their relationship with the ultimate users of their scientific and technical services. As a result, the national laboratories are increasingly isolated, rather than integrated with the user. These circumstances produce a very slow rate of adaptation by the laboratories to the needs of the user. In an environment where user requirements are subject to fast-breaking major policy changes such as the implementation of the nuclear posture review, this slow pace of adaptation is not helpful to the national leadership.

The nature of the managerial arrangements with the university-affiliated national laboratories is compounded by the pricing practices of the laboratory's work for others that limits the abilities of the laboratory users, both the Department of Defense and the intelligence community, to rationalize their own science and technical effort. On this point, there is some good news. It is reported that some significant concessions on the pricing of laboratory services have been made to the Department of Homeland Security in its use of the national laboratories for science and technical research, though the relationship to the user remains indirect.

I believe in the short term there is substantial scope to improve the management of the laboratories and yet retain their university affiliation. In the longer term, I think we need to consider perhaps some more sustainable relationship between the national laboratories and the defense user, but I go into some greater length in my testimony on that point.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Schneider follows:]

PREPARED STATEMENT OF DR. WILLIAM SCHNEIDER, JR., CHAIRMAN,
DEFENSE SCIENCE BOARD, DEPARTMENT OF DEFENSE

Mr. Chairman and Members of the Committee:

It is a privilege to have an opportunity to appear before this subcommittee. I am William Schneider, Jr., Chairman of the Defense Science Board (DSB) in the Department of Defense. Founded in 1956, the DSB is a Federal advisory committee that advises the Secretary of Defense on matters of science and technology. Issues pertaining to the health of the technology base and the scientific and engineering institutions that maintain that technology base have been an enduring interest of the DSB. The ability of the nation's scientific and engineering institutions, especially those primarily involved in supporting the U.S. government's national security function, are crucially dependent on the structure of governance in which they operate. The U.S. National Laboratories operated by the National Nuclear Security Administration (NNSA) and the Department of Energy (DoE), and especially the two nuclear weapon design laboratories (Los Alamos and Lawrence Livermore National Laboratories) face immediate issues of governance as the underlying model—a university-affiliated government-owned, contractor operated (GOCO) entity—has become a subject of a debate. In the longer term, the question of governance of the laboratories and the associated industrial complex supporting the nation's nuclear

weapons program may need to be considered in light of evolving role of nuclear weapons in the U.S. national security strategy.

In my remarks, I will address four issues pertinent to considerations of governance both with respect to immediate as well as long-term issues before the U.S. government derived from observation of laboratory governance in the DoD.

- Changes in the sources of science and technology for national defense.
- Recent studies by the DSB on the modernization of the DoD laboratories.
- Implications for changes in near-term NNSA laboratory governance.
- Longer term implications for governance of the nuclear weapons complex.

CHANGES IN THE SOURCES OF SCIENCE AND TECHNOLOGY FOR NATIONAL DEFENSE

The Defense Science Board conducted a study of the impact of the globalization of technology on national defense in 1999. A copy of this study, *Final Report of the Defense Science Board Task Force on Globalization and Security*, is provided to the Subcommittee for its use. This study took note of changes underway for more than a decade in the source of the technologies that produce superior military capabilities for the Department of Defense. The technologies that create the enabling features of advanced military capabilities are now emerging primarily from the civil sector, especially in information technology, materials, and software engineering. In the past, technologies used for military applications were developed in secret, and integrated into modern weapon systems by the defense industrial sector. In the 1950s and '60s, the defense industrial sector was often embedded in conglomerate industrial firms, hence contributing to a "trickle down" approach to the transfer of defense technology to the civil sector.

During the 1980s and '90s, technologies developed in the civil sector for civil applications in information technology, materials, software engineering and other disciplines, when adapted for military applications began to produce new and revolutionary gains in military performance. These new capabilities in turn became the enabling factor that permitted the use of new concepts of operation built around weapon systems operating in a network rather than independently that became such an important contributor to coalition success in the recent Afghanistan and Iraq campaigns.

During the past two decades, the defense sector became of user of diminishing economic importance to the advanced technology civil sector, contributing to the growing divergence between the civil and the defense sectors. The latter became increasingly specialized in the defense market, while institutional, financial, and legal barriers to entry abetted by DoD acquisition practices discouraged direct civil sector participation in the defense market.

The defense industry's role has become increasingly focused on creating unique military advantages for the U.S. defense establishment from technologies that are, with but a few exceptions, are largely derived from a global technology base that is accessible to ally and adversary alike. The defense industrial sector must apply its skills in systems engineering and integration to produce superior military capabilities.

The underlying change in the sources of technology has converged with the need to recognize the impact of the proliferation of advanced technology and the changes in international security affairs since the collapse of the Soviet state in 1991. The centrifugal forces sweeping international politics that have affected much of the world in the past decade combined with nearly universal access to advanced technology since the end of the Cold War have produced an environment where the U.S. can no longer forecast who its adversaries will be. As a result, the U.S. cannot optimize its military posture against its most likely adversaries as it could do throughout most of its history. For the 21st century, it must transform its military establishment to one that is composed of highly adaptive and flexible forces able to be reconfigured without recapitalization to meet future needs. The military applications of science and technology will be crucial to the prospects for our diplomatic, economic, and military future. More recently, the role of S&T in homeland security and defense have added to the urgency of transformation. The government's S&T infrastructure needs to be modernized to incorporate the fundamental changes in the international environment, particularly that portion directed primarily at the national security function.

RECENT STUDIES BY THE DSB ON THE MODERNIZATION OF THE DOD LABORATORIES

The application of science and technology for national defense has been a core concern of the DSB since its founding in the 1950s. During the past decade, the DSB has conducted a number of studies concerning various aspects of the science and technology function in the DoD. In Section 913 of the National Defense Authoriza-

tion Act for Fiscal Year 2000, the DoD was directed to conduct a study of defense laboratories and test facilities. The DSB was involved in supporting the Department in meeting that requirement. The DSB produced a report that assessed and summarized its studies over the past decade on the subject. The study was led by a senior member of the DSB, Walter Morrow of MIT's Lincoln Laboratory. Subsequent to Dr. Morrow's report, the DSB's 2001 Summer Study addressed the need to refocus the DoD science and technology function to meet the needs of transformation. Copies of Dr. Morrow's Task Force report, *Report of the DSB Task Force on Efficient Utilization of Defense Laboratories* (2000), and the *Defense Science Board 2001 Summer Study on Defense Science and Technology* are provided for the subcommittee's use.

I will not attempt to reproduce the DSB's observations and recommendations here, but will take this opportunity to focus on one aspect of the problem—human capital—that is a cross-cutting issue between the DoD and NNSA laboratories, and goes directly to the issue of governance. The problem of recruiting and managing scientific and technical personnel in the Federal government is a long-term problem. Apart from a few exceptional institutions within the DoD, maintaining professional excellence in scientific and technical fields is difficult because government service is not competitive with other career choices in many circumstances. The DSB has recommended a number of reforms, but many are difficult to implement in a governmental setting.

Some are, however, quite practical. For example, propagating the recruitment practice of DARPA which is able to avoid most of the bureaucratic impediments in recruiting scientists and engineers from the private sector is a relatively simple option to implement. Among the most successful S&T institutions in the defense establishment are those closely affiliated with external organizations including universities and other centers of excellence. As will be discussed elsewhere in my testimony, such an environment can provide a particularly supportive professional environment for S&T personnel—even in a governmental or quasi-governmental setting.

IMPLICATIONS FOR CHANGES IN NEAR-TERM LABORATORY GOVERNANCE

The Cold War-era division of labor between DoD laboratories that serve defense needs, and the laboratories of the nuclear weapons complex that uniquely serve the this specialized requirement no longer reflect the reality of 21st century national defense needs. As previously noted, the human capital dimension of the nation's science and technology effort is the decisive factor in its success. The difficulties facing the U.S. government in general, and the DoD in particular in maintaining the its scientific and technical expertise has been a preoccupation of the DSB for many years, and proposals to mitigate the decline in the S&T competence in the DoD have figured prominently in DSB recommendations.

The national security laboratory structure of the U.S. government to include those funded within Budget Function 050—NASA, DoE/NNSA, and the DoD—need to be considered in a “holistic” manner to optimize their ability to support U.S. national security rather than as entities of individual agencies. The institutional barriers, especially between the DoD and DoE/NNSA laboratories are a particular burden on ability of the national security science and technology sector to make best use of the aggregate resources made available through appropriated funds.

The DoE/NNSA national laboratories are an important, but underutilized source of S&T competence in the national security sector. The manner in which the laboratories are governed is an important source of this underutilization. The national laboratories, especially those involved in the nuclear design and weaponization functions, Los Alamos, Lawrence Livermore, and Sandia are thought to be “science” laboratories when in fact they are both science and applied engineering laboratories. This orientation reflects the fact that the “science” surrounding nuclear weapons is highly empirical rather than theoretical. This characteristic has made it necessary for the three nuclear weapon design and weaponization laboratories to develop an extraordinary capability for applied engineering in addition to their core competence in fundamental science. The capability of these laboratories—both human and material—to support the Department of Defense and the Intelligence Community, and more recently, the Department of Homeland Security is widely recognized.

Under the category of “work for others” the three laboratories perform nearly \$1 billion annually in S&T services for the DoD and IC. Nevertheless, the effective utilization of these laboratories leaves much to be desired.

1. The manner in which “work for others” is procured by the DoD and the IC is inefficient because there is no opportunity to rationalize user requirements with the capabilities of the NNSA laboratories. Instead, the “work for others” is accomplished by episodic arrangements between the DoD/IC and the national laboratories during the course of a given fiscal year. In many cases these ar-

rangements reflect emerging or unanticipated the needs of the DoD and IC to acquire the services of individual scientific and engineering specialists to supplement in-house capabilities. The process is repeated anew at the start of the fiscal year. These practices do not permit the efficient allocation of S&T services and establishing priorities to meet DoD and IC requirements, and undermines effective S&T resource use in the national laboratories.

2. The cost structure of the national laboratories does not differ significantly from that of the DoD or Intelligence Community. Nevertheless, interagency pricing practices created by the intermediation of the DoE and NNSA cause services provided to the DoD and the IC from the national laboratories to be significantly more costly than either the DoD or the Intelligence Community. These pricing practices governing the acquisition of personnel and services from the national laboratories inhibit the rational allocation of national security resources within the Federal government.

3. In its 2001 Summer Study, the DSB identified four transformational challenges biological warfare defense, finding difficult targets, making timely and accurate decisions, and enabling high-risk operations. The national laboratories are at best, marginal participants in these programs despite their formidable capacity to contribute to them. Similarly, other important programs such developing effective defenses against cruise and ballistic missiles do not have the participation from the national laboratories proportional to their underlying strength. This is so for institutional, not scientific or technical reasons.

There are some lessons to be learned from DoD experience in laboratory governance that may be pertinent to modernizing governance in the national laboratories. The DoD provides R&D services to the Military Departments and defense-wide institutions through a variety of institutional forms including civil service laboratories, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARC), Government-owned/Contractor-Operated (GOCO), and many others. Many of these have been highly successful for decades, while others have enjoyed a period of success followed by a decline in performance over time. For purposes of illustration, I will focus on one form of institutional governance—FFRDCs and some of the observations that have emerged from DoD's experience.

The Federal government currently supports 36 FFRDCs in the fields of aviation, defense, energy, health, space, and tax administration. The DoD sponsors nine of these FFRDCs. These organizations support the DoD in scientific research, systems development, and acquisition, and related tasks. They are organized as independent non-for-profit entities. A DSB study of the FFRDCs in 1997 affirmed their value to national defense, and identified four characteristics that accounted for their success:

- They have unique competence and quality.
- The FFRDCs are closely integrated with their sponsor.
- They adhere to strict constraints to minimize institutional conflicts of interest to promote objectivity, and to ensure independence from interests that may conflict with sponsor interests.
- The FFRDCs maintain a continuity of relationship sufficient to establish “corporate memory” in topics of critical interest to the sponsor.

Two of the nine DoD FFRDCs are also associated with a university. One of these university-affiliated FFRDCs, MIT's Lincoln Laboratory is among the oldest of the FFRDCs, and recently celebrated the fiftieth anniversary of its founding. In this respect, it is perhaps the closest parallel to the NNSA laboratories that are associated with a university (the University of California in the case of the Los Alamos and Lawrence Livermore National Laboratories).

There are two important distinctions between the DoD experience with university-affiliated laboratory governance and DoE/NNSA practice pertinent to the committee's inquiry. The first pertains to the relationship between the laboratory and the user. The linkage between Lincoln Laboratory and the user committee is both direct and very close. There is very little intermediation and micromanagement by the administrative apparatus of the Department of Defense between the laboratory and the users of its services. The university environment provides an environment where human capital can be developed and accessed by the laboratory ensuring a strong cadre of highly trained professionals conversant with the most advanced technology in the laboratory's areas of responsibility as an FFRDC.

A “user committee”—Lincoln Laboratory's Joint Advisory Committee—includes the Director of Defense Research and Engineering as its Chairman, with membership including service Assistant Secretaries for R&D as well as the Directors of DARPA, the NRO, and MDA. This close coupling with the user at the leadership level provides timely insight, guidance, and oversight to the Laboratory.

The second is the relationship with the university itself. Lincoln Laboratory has an extremely close relationship with the University (in this case, MIT) in physical, intellectual, financial, and managerial terms. This close relationship creates a “virtuous circle” that produces a high quality professional staff and intellectual output, as well as close supervision of the laboratory by the University on fiscal and safety matters.

The DoD practice contrasts sharply with the two DoE/NNSA university-affiliated national laboratories; Los Alamos and Lawrence Livermore. Extensive fiscal, contractual, security, and administrative requirements of both agencies are cascaded down to the laboratories, often overwhelming the university presence. The relationship with the ultimate user is indirect and filtered through both organizations. This practice diminishes the benefits of university affiliation since the day-to-day relationship with two government agencies dominates the process of executing the contract with the university.

Moreover, the dominant role of the two agencies in the day-to-day operations of the two laboratories prevails over their relationship with the ultimate users of their scientific and technical services. As a result, the national laboratories are increasingly isolated rather than integrated with the user. These circumstances produce a very slow rate of adaptation by the laboratories to the needs of the user. In an environment where user requirements are subject to fast-breaking major policy changes (e.g. the implementation of the *Nuclear Posture Review*), this slow pace of adaptation is not helpful to the national leadership.

The nature of the managerial arrangements for the university-affiliated national laboratories is compounded by the pricing process for laboratory “work for others” that limits the ability of the laboratory users (the DoD and the IC) to rationalize their own S&T effort. On this point there is some good news. It is reported that some significant concessions on pricing of laboratory services have been made to the Department of Homeland Security in its use of the national laboratories for S&T research though the relationship with the user remains indirect.

LONGER TERM IMPLICATIONS FOR GOVERNANCE OF THE NUCLEAR WEAPONS COMPLEX

The governance of the nuclear weapons complex is an important long-term issue. In my view, the current structure of a semi-autonomous entity levitated between two cabinet departments is not a sustainable approach to the management of the nuclear weapons function. When the Congress created the current structure, the immediate post-Cold War euphoria relegated the nuclear weapons responsibilities of the national laboratories to the rather narrow preservationist role of “stockpile stewardship.” The diagnostic and experimental facilities created to support the “stockpile stewardship” mission have much broader application to national security than is implied by their application to the stewardship role.

National policy—as reflected in the President’s *The National Security Strategy of the United States* (September 2002), *National Strategy to Combat Weapons of Mass Destruction* (December 2002)—has been reinforced by the *Nuclear Posture Review* (January 2002). These documents significantly broaden the scope for the national laboratories in support of the national security, and more recently, the homeland security function. Although the role of nuclear weapons has changed drastically since the end of the Cold War, a strictly preservationist posture is insufficient to meet national needs. Two studies are underway this summer—including one by the U.S. Strategic Command, and a separate, but related effort by the Defense Science Board—will help to further understanding of how the nation’s nuclear weapons posture could evolve to meet policy requirements. However, it is possible to deduce several implications from the characteristics of the change in national policy that are likely to require revisiting the governance of the national laboratories, and the associated industrial complex supporting the nation’s nuclear weapons program.

1. Nuclear weapons are likely to retain a vital, but much narrower role in U.S. national security policy than was the case during the Cold War.
2. Cold War era concepts and metrics that supported the calculus of deterrence in the Soviet-American competition may not be sufficient in all cases to cope with the phenomena of the widespread proliferation of weapons of mass destruction and their means of delivery.
3. The instruments deterrence or dissuasion of the threat or use of weapons of mass destruction (including both nuclear and advanced conventional weapons) are likely to be more integrated with other diplomatic and advanced conventional national defense capabilities than was the case during the Cold War. The integration of the nation’s post-Cold War nuclear posture is aimed at providing the President with a more abundant set of responses to threats than existed in the past.

4. The legacy Cold War nuclear weapons stockpile—even if their underlying safety and reliability can be preserved—may be insufficient to meet 21st century policy requirements.

5. The nation's nuclear weapons complex must be no less flexible, responsive and adaptive to unknown future threats than is the balance of the national defense establishment.

These circumstances suggest that the nuclear weapons complex will need to be much more closely coupled and more responsive to the user (the DoD, the Combatant Commanders, and the Military Departments) than was the case in the past. However, it seems unlikely that the existing institutional arrangements are unlikely to produce a national laboratory and manufacturing complex that is responsive to the speed of adaptation required to meet 21st century security threats. Addressing this issue here is beyond the scope of this hearing. However I believe it to be important that efforts to resolve near-term issues of governance for the national laboratories be carried out with a view toward achieving an effective and sustainable system of governance for the laboratories in the long-term.

I will be pleased to respond to questions from the Committee.

The CHAIRMAN. Thank you very much. Senators, let's proceed now to questions. I'll have a few and yield to Senator Bingaman quickly.

Mr. Reis, one of the primary sources of the idea for the creation of the NNSA, and you worked closely—in fact, it is thought that you were removed by then-Secretary for your role in working to create the NNSA. I have a very serious concern now. We've been in existence for a short while, that is, NNSA, but I recall our meeting several years ago when the National Nuclear Security Administration was crafted. You provide suggestions. I thought they were good.

Our goal was to improve the governance of the national security programs by simplifying rules, simplifying regulations and reporting structures of the Department. We tried to address the frequent disruptions of DOE because we talked frequently about the dysfunctional bureaucracy that was there for various reasons by freeing the NNSA from many of these constraints. We thought we were succeeding in creating the NNSA as a semiautonomous entity, but I've been concerned that the progress toward that original vision has been rather slow.

I realize that the formation of the NNSA has hastened your departure, but I wonder if you can comment from your perspective on the extent to which the current operations match the vision that was crafted for it.

Dr. REIS. Thank you, Mr. Chairman.

The CHAIRMAN. Would you care to do that?

Dr. REIS. Sure. I'll give it a shot. I should say I've enjoyed my time since I've left the Department of Energy quite a bit, and I hope it's been fairly productive as well. You might want to discuss that a little bit later, but these things take a fair amount of time, and frequently they take more time than one would hope would be.

In terms of the NNSA moving towards a vision that you and I and, I suspect, Senator Bingaman as well, and some of the members on the committee shared when I helped the creation of that. As I recall, it was a 99 to 1 vote in the Senate, creating NNSA, and thinking about that, you really have to look at the product that's coming out at the other end.

I recently had a chance to visit, for one reason or another, all three laboratories, Sandia, I had an opportunity to review what they're doing in homeland security, and it really was rather spec-

tacular. I had an opportunity to visit the National Ignition Facility a few months ago, and they're just moving along just like gangbusters, and just several weeks ago I chaired the advisory panel on weapons physics at Los Alamos.

And Los Alamos in particular, despite the fire, and despite the concerns about security, and despite the auditing issues, are just moving along extremely well in really understanding what the problems are that one has to deal with in stockpile stewardship in terms of connecting the science, if you will, to our understanding of nuclear weapons and moving ahead.

So from that perspective, in terms of work that's actually getting done in the weapons program by those laboratories, despite everything, they're doing extraordinarily well in some very, very rocky times, which tells me that things are moving along, perhaps if you dig down, a little better, perhaps better than the press would necessarily have you believe.

I also felt that as we had talked, that one of the reasons to have a semiautonomous agency is that you get the type of leadership going into those organizations that make sense at the top. Certainly John Gordon and now Linton Brooks I think have provided that type of leadership. They're really first rate, really first rate individuals, and the people right below them. I think Edward Beckner and Paul Longworth, I mean, these are people who really understand what the problem is, but it takes time.

Part of the reasons you're having these hearings, I think, and some of the discussions I think that my fellow testifiers have said is that you're dealing with a large, complex organization, and it just takes longer than one would hope, I think, so to answer your question, has the vision succeeded yet, I'd say the part that really counts in the sense of, are they working well, are they working better at the laboratory, I think the answer is yes, they're doing a very, very good job.

Has the bureaucracy yet come around to it? I don't think it has yet, but I think the vector is pointing in the right direction, and again I've been impressed at the leadership and what they're trying to do.

The CHAIRMAN. Well, Mr. Reis, let me just say, Dr. Gibbons mentioned some things that just popped out in my mind that existed when we decided to go with the NNSA, and I still see them. He used the word, layering.

One of the problems with our laboratories is not only layering seems to be a central consequence of arrangements we have, but every time we've got a problem, a layer seems to me to be created. I used to call them boxes. You know, you get into a security issue and a new box is created, and they put it on there on a map, and they call it the security box. We thought we were getting rid of layering, Dr. Gibbons, when we did the NNSA.

And so let me just close this question, Mr. Reis, and say that my own view is that NNSA requires that: one, that the man that heads it is extremely competent. I won't argue with you that perhaps we have that person, but secondly, it seems to me it requires a Secretary that is willing to cut the umbilical cord and let the NNSA run.

I almost thought of it on some occasions as, if they can't get it broken, where the NNSA is running on its own, they may be ought to move out of the Department of Energy and physically get out of there and open their own headquarters. Secretaries don't like that. They don't even like you to think of it. They're supposed to be right there, with their arms around them, as they've always been.

Do you have an observation? Am I right in what we ought to be looking for, and will that ever occur, unless and until a Secretary is truly willing to say, it's not mine any more?

Dr. REIS. I think it's a question of what do you mean by mine?

The CHAIRMAN. I agree.

Dr. REIS. I mean, I was the Director of the Defense Advanced Research Project Agency, DARPA, within the Department of Defense it's always recognized as one of the more successful organizations. I can tell you privately, privately or now I can tell you what my instructions were when I took over that job. It was during a time of some controversy. At the time, Deputy Secretary of Defense Atwood said to me, he said, Vic, you can run it, do anything you want, just stay out of the newspapers.

Now, I tried to do that, but what it really represented was that there was a close bond between myself and the Deputy Secretary and then the Secretary of Defense, now our Vice President Dick Cheney, and we would meet once a month and we'd discuss a few things, and that was about it. There was very little bureaucratic management. It was a very different operation. We didn't have a lot of laboratories to run, we didn't have to worry about a lot of safety concerns, but you can do it.

NOAA, you know, is another example of an embedded agency within a large organization, but it requires—and I get back to Sig Hecker's testimony, it really requires a level of trust that the Secretary can come in, whoever that Secretary may be, and look to the Director of the NNSA and say, it's yours, you run it, let me know what help I can give you, not here's how you basically have to run it.

But you're dealing with a Department of Energy that is, after some 30 years is still trying to basically work its situations—I think Dr. Gibbons gave some success stories.

You know, when I was in the Department of Defense, everybody in the Department of Defense knew what they were doing. I mean, they knew what their mission was, whether they were doing family medical supplies or special operations. You don't have that yet in the Department of Energy, and when you have that, I believe, when that's part of it, you'll start to develop that trust within the Secretary—you know, within the Secretaries, within the Congress that says, okay, you know, we trust you, you're the man, the woman, as the case may be, here's your mission, we agree with that mission, come back and let us know what you're doing.

The two specific examples I gave, and some of the other examples that some of the people gave, shows you how that trust basically can be developed. If the trust is there, the oversight melts away. I mean, it's very hard to remove all those boxes. What it requires is people doing their job on a day-to-day basis, and that oversight just melts away over time, and we're just starting to move towards that.

The CHAIRMAN. Senator Bingaman.

Senator BINGAMAN. Let me just ask a very general question here to start. It seems to me the focus here in Congress, and generally in the country, to the extent people think about management of the labs, they think of how do we effectively, efficiently, competently be sure the labs do what they are assigned to do, carry out their missions without any security lapses, without losing any hard drives, without getting in the newspaper, and that's sort of the focus of all of the management issues.

It strikes me that the more useful focus would be, how do you ensure that the talents and capabilities of these laboratories are allowed to feed into and serve our national interests most effectively, and how do we structure the rest of government to benefit from the scientific and technological advancements that are possible at the labs. It's sort of a different perspective, and a very general question, but it strikes me that all of the management oversight, and layers upon layers of oversight, and different oversight boards, are all intended to just be sure no one makes a mistake, and that's the wrong focus. That's a very short-sighted focus, it seems to me.

Dr. Gibbons, do you have any thoughts on any of that?

Dr. GIBBONS. Just that I agree with you entirely, Senator, one has to have an operation that's run without falling over itself in terms of administrative procedures, but it seems to me the real challenge for leadership in both the oversight from external review committees and the like and also the internal leadership of the labs, is to keep the work of the people in the context of overall national interests and national objectives. It's a little easier to do this if you have a well-defined, sharply defined mission, as we do more so in DOD than we do in DOE.

A lot of the work in the DOE labs has to do with trying to understand how the world works, not how to do the sorts of things one has to do in defense, so it seems to me that what's imperative on top of good, traditional management procedures is a capability of keeping the laboratories' professional workers, all the workers fully understanding and appreciative of the context of their work in terms of national interest, and that will hopefully help draw these labs together so they share and cooperative and work together, rather than tend to move off into separate universes, and it seems to me that's the great challenge, is leadership now within the laboratories.

Senator BINGAMAN. Let me bring this down to a real specific, Dr. Gibbons.

When you were Director of the Office of Technology Assessment's Life Sciences Division back in 1983, you directed a study of the polygraph as a tool for the widespread screening of employees. Last year, as a result of a congressional request, we had the National Academy of Sciences update that review, and look at DOE's use of the polygraph to screen about 16,000 agency and contractor employees, and as I read their report, they concluded that although there may be some legitimate role for polygraphs in event-specific investigations, they could not find any justification or valid use of the polygraph as a screening device the way it's being used. Do you have any thoughts on that general issue?

Dr. GIBBONS. Senator, I was not the Director of the Health Division, but I was Director of the OTA at the time, and I was pleased at the work we did, which was early on in terms of polygraphs, mainly their applicability not so much in terms of criminal investigations, where you know a lot about the situation and the individual, but in terms of their applicability to screening, and the work we did, which was a relatively brief study, showed that we, the Nation, knew at that point almost nothing about its viability for broad screening, and what worried us at OTA was that there was a move afoot to do enormously broad screening as a means of filtering potential employees in the defense and intelligence sectors. Indeed, our concern was that one might get fooled by this kind of procedure, and have some undesirable people make it through that screen and therefore give us a lot of problems.

That was in the early eighties, early eighties I believe, that we did that study. I see nothing today that invalidates those conclusions, and that gave me therefore great concern, and I believe the Academy of Sciences updated study is more or less in agreement with that early study. That's why I have a great deal of concern about the intended use of polygraphs as a screening thing for DOE. It honestly strikes me as more a political response to a problem than an analytical response to a problem.

Senator BINGAMAN. Thank you very much.

Dr. Spencer, your testimony seems to imply that you do not think universities are well-suited to manage laboratories. Am I reading that correctly and, if so, did you want to elaborate on that view?

Dr. SPENCER. I don't think the question is they're not well-suited. I think the University of California did a good job of managing the two weapons laboratories for several decades after the formation of Los Alamos in the 1940's. I think it pertains to the question you raised just a moment ago, and that is, focusing on what these laboratories need to be doing. I believe the mission for the three weapons laboratories is very clear. It's the safety, security, and reliability of our current stockpile without nuclear testing. I think that's a very clear mission.

The problem that we're getting into is one that you raised. We're not focusing on meeting that mission, but we're responding to innumerable requests which often cascade down through the organization so that the time of the individuals in those laboratories today is taken up with audits and oversight and other issues that are not pertaining to the management issue.

The difference between the university or a national laboratory focusing on those objectives in business is, in business if you don't do it, you're out of business. If you don't focus on what your job is, where the market is, what your customers want, you don't exist after a short time, and in a defense laboratory, or a DOE laboratory, or a university, that doesn't happen, and so I think that business is better qualified today, has the experience, and can focus on what needs to be done to meet objectives than universities or other management organizations would have for these laboratories.

I think that in addition, if you look at a business, generally you've got, if it's a good business, well-managed, it's got an independent board, and let me give you an example, one of two which

I personally was involved with, and I'm not happy with the way it was done, but if you look at IBM in the late eighties and early nineties, when they began to suffer from all of the problems of focusing on central computing, while PC's were taking over the world, the board recognized that the management at IBM was not doing the job they were supposed to, and they removed Mr. Akers. Now, if you had asked me in 1990, when they brought a cookie guy in to run IBM, I would have said, it's not going to succeed. However, it was a major, major success for them.

On the other hand, my old company, Xerox, had a rubber stamp board, one individual sitting in the chairman, president, and CEO job, and so there was no one to blow the whistle on the company when it began to get into trouble.

You can have good boards and bad boards, good business and bad business. I think there are some simple guidelines on how to choose ones that can do the job the way it should, and to focus on what the objectives of the organization should be. I would think you've got a really excellent opportunity now, as you think about competing the management position for Los Alamos and whatever you decide to do about Livermore to run an experiment in exactly that.

Find a way to attract the very best corporation possible, or perhaps a group of corporations to manage this activity, choose a Director that—and there's some good models from early Directors at Los Alamos, at Livermore, and at Sandia, and have the oversight performed by an independent board with a set of objectives that they're going to be measured against not whether they met certain criteria each day, or each week that an oversight board would, that currently oversight boards are looking to.

I think you've got an opportunity to do that and see whether you can set up an entirely new model for Government-owned, corporate operated facilities.

Senator BINGAMAN. Thank you very much.

The CHAIRMAN. Thank you. Thank you very much, Doctor.

Senator Alexander.

Senator ALEXANDER. Dr. Spencer, the oversight board would not be the board of the corporation, it would be a new entity?

Dr. SPENCER. I would think, Senator, that the oversight board should be chosen very similar to a corporate board would be, in which it would report either back to the Senate, back to Congress, or to the Department.

Senator ALEXANDER. And who would appoint it?

Dr. SPENCER. Well, I think the shareholders in these laboratories should have a responsibility for vetoing that and perhaps for identifying that board.

Senator ALEXANDER. And the shareholders are?

Dr. SPENCER. The people of the United States, represented by the people here in Washington who oversee that responsibility.

Senator ALEXANDER. I'm not sure that the political process has distinguished itself in appointing highly qualified board members.

Dr. SPENCER. I would agree with that, and I do not believe it should be the political process that chooses them. However—

Senator ALEXANDER. But who would choose them?

Dr. SPENCER. I think the management of that company—

Senator ALEXANDER. Exactly who? Oh, the company itself would choose them.

Dr. SPENCER. Would choose them, but I believe they should not be members of that company.

Senator ALEXANDER. So if Lockheed Martin were running Oak Ridge, Lockheed Martin would pick a separate oversight board?

Dr. SPENCER. That's right, but if they're not independent, I think you have the responsibility of saying, those who are not independent directors. Somebody has to decide.

Senator ALEXANDER. The Senate would then confirm the board, or something that like?

Dr. SPENCER. I think the board has to report back here. I don't think the board should be a part of the management activity, but entirely independent.

Senator ALEXANDER. Let me continue on that. I've been a university president on the faculty of the university and on the board of a company that managed a laboratory, and as I look at the list of DOE laboratories, there's one example that's a little different. Maybe Brookhaven is also, and I wonder what—any of you, but Dr. Spencer, you've talked about universities. Dr. Gibbons, you've been at Oak Ridge. U.T. Betel manages Oak Ridge. There's a combination of a business and a university managing a laboratory.

Now, when I first heard about that, I thought that wouldn't work, but the more I thought about that, I thought, well, that might work, and they got a good rating the other day from the Department.

The idea of a university managing a laboratory is almost a—well, you don't manage a university. I remember when President Eisenhower was the president of Columbia University he called the faculty together for a meeting on the first day and said, I just wanted to get together all the people who work for me, and he went straight down after that. He had to just slip out of Columbia University, embarrassed by having been there.

So universities aren't managed, yet laboratories do have two very separate sorts of things going on, both of which you've talked about. One is this whole set of very specific businesslike deadlines and goals and procedures, all that sort of thing. Businesses are very good at that. Universities are awful at doing that. The idea of a university managing that sort of a set of responsibilities is a horrifying thought, actually, because that's not what universities are good at.

On the other hand, universities are good at setting up dozens of little fiefdoms which attract enormously talented people who, if they're enormously talented then go to work and do great things and gravitate to other interesting people and out come these great results, so you would want that culture in connection with a lab like Oak Ridge or many of the others, but you have the separate set of management responsibilities, and maybe the compromise of having a business and a university would recognize that there are just two very different tracks going on at many of these laboratories, and you want the university culture, but at the same time you want somebody there who has experience, responsibility, and a set of skills that deal with all these almost extraneous things to

that environment, and I wondered especially what Dr. Gibbons and you thought of that model, the U.T. Betel type model.

Dr. SPENCER. Let me apologize, because I don't think I've answered your first question very well, and then come back to this. I agree with your assessment of universities. After I retired for the third time and flunked third time retirement I joined the University of California as a regents professor for a while. I sat in the faculty meetings in both the business school and the engineering school. It's frustrating for a businessperson to sit in those meetings, because it is very much like herding cats, but I think a possibility of having a university and a company jointly responsible is a possibility.

I think right now the issues that the weapons laboratory face would be better served over the next few years by having that done totally by a corporate organization managing it, and I think that corporate entity needs the oversight of an independent board made up mostly of individuals not in that organization.

If you look at the Sarbanes-Oxley legislation recently they've put a great number of restrictions on what an independent board member is in a private corporation. Those ought to fit just as well on a corporate board or an oversight board for the weapons laboratories. The managing organization might identify individuals.

If the people who provide the money to that organization do not feel those are independent directors they should have the right to veto them, but I think you could put together outside directors for an organization like this that would be independent. They'd have to be knowledgeable. They'd have to be involved. They'd have to be willing to put in the time. They could provide an oversight in a much simpler way, getting rid of the layering, the boxing that we currently have and provide a much more efficient organization.

Senator ALEXANDER. Mr. Chairman, I wonder if we could see if Dr. Gibbons had an answer to the question about the corporate-university model.

The CHAIRMAN. Sure.

Senator ALEXANDER. Or anyone else.

Dr. GIBBONS. Senator Alexander, I think you raise a very important issue here, because the labs are different in their missions and in their characterization, and I think the model of a university or a research organization like Midwest Research Institute and a private sector corporation are—they each have potential roles to play here, but one of the problems I've seen in my—I serve on the National Advisory Committee to the NREL, the National Renewable Energy Lab, which has a similar oversight for NREL.

There's a question that arises about who takes the lead. If you have two entities serving, who, in fact, is the lead, and how do these two organizations merge themselves together in terms of an effective oversight, and I think we're in the midst of an experiment there, and it's worth of continuing, because having those two different perspectives can be terribly important, especially for multipurpose laboratories like Oak Ridge or NREL, and so I think we should watch it carefully, but continually ask the question, is this multiplicity of groups managing that place giving a better job than if only one were doing it and the other were subsidiary and giving advice.

You could think of, for example, an organization having the managing responsibility for a multipurpose lab, but committed to having a strong academic presence in their oversight activities, but I think who takes the lead is an important question to ask. I don't believe there's been enough experience yet to say whether or not this is a major improvement, but I think it's worthy of continuing but also evaluating it.

Dr. SCHNEIDER. Mr. Chairman, if I may just add a point to the question raised by Senator Alexander, I believe that the university affiliation is a decisively important aspect of the performance of the labs, especially in the case of the laboratories we've been discussing, Los Alamos and Livermore Labs.

The most decisive factor in the success of these labs is the human capital, and the affiliation with the university is perhaps the most important source of renewal and engagement of the laboratory at the cutting edge of science.

The experience the DOD has had with, as I mentioned, in the case of the Lincoln Laboratory, the work they do is just as sensitive as that done at Livermore Lab and the Los Alamos Lab, and is no less technically complex, but the intense involvement of the university has produced a renewal and recapitalization, so to speak, of the human capital that has been a decisive source of their success and contrasts very sharply with the civil service laboratories that do not have a similar mechanism for the renewal of the human capital in these laboratories, so while there may be a number of arrangements that can be made to deal with areas where the university competencies are not particularly well engaged, I think the university's affiliation is a decisively valuable asset for these laboratories and should not be ignored.

Thank you, Mr. Chairman.

The CHAIRMAN. Could I do this, so that we can establish a few basic principles in any event. It would appear to me that the question of how you formulate the management is one question, but what should be part of it is another, and I think we are saying, if I'm hearing you right in response to the Senator from Tennessee, that the laboratories of the type of Los Alamos and Livermore must have as part of its lifeblood the university system. Is that correct, Dr. Reis?

Dr. REIS. That's correct.

The CHAIRMAN. And do you agree, Dr. Spencer?

Dr. SPENCER. Senator, I agree. However, those ties with the universities can occur in a variety of ways.

The CHAIRMAN. I didn't say that so well in my opening remarks, but I meant that. How they are established is up for discussion, but in the end, whatever we do they must be there. The ties must be there with the universities. You agree with that?

Dr. SPENCER. Yes, sir.

The CHAIRMAN. And do you agree, Doctor?

Dr. GIBBONS. Indeed.

The CHAIRMAN. And Bill.

Dr. SCHNEIDER. Yes.

The CHAIRMAN. Let me tell you what I think is happening now. It is an amazing paradox that if I've heard you correctly you've said, of late, meaning the last 7 years of the two nuclear labora-

tories, Sandia, Los Alamos, and Livermore have been doing remarkably well because they now have a very precise mission, to wit, science-based stockpile stewardship, and I think I heard you say they're doing that job very well, is that correct, Dr. Schneider?

Dr. SCHNEIDER. Yes, sir.

The CHAIRMAN. And Dr. Gibbons?

Dr. GIBBONS. Yes.

The CHAIRMAN. And Dr. Spencer?

Now, if you read the newspapers, and if you read the response of the University of California to what's been going on at the laboratories by way of scrutiny, I guess is the word, you would conclude the opposite, and as a matter of fact, the University of California has appeared so frantic of late because of scrutiny that one would wonder, I would anyway, I did, whether Los Alamos was vulnerable to an accusation that they weren't doing their job very well at all.

What I believe we're suffering from that we'd better address in any new model is that these laboratories are going to live in an era of intense scrutiny that did not exist back in the days when Ma Bell managed Sandia, or the original people that we're so proud of that managed Los Alamos. The scrutiny, in fact the scrutinizing institutions didn't exist. I'll just be honest, there was no Pogo then. Have you all heard of Pogo?

There is a Pogo now.

Dr. REIS. You have met the enemy, right, Pogo?

The CHAIRMAN. Yes, that Pogo really fits that one. We've met the enemy and it's us. As a matter of fact, it's rather interesting, some people are trying to find out where Pogo comes from, who pays for Pogo, where do they get their money, and some say it's nobody's business, but I think pretty soon it's going to be somebody's business, because they are great scrutinizers of the laboratories, and it would seem like, in some cases, it's being done altruistically. We have people working for Senators around here that don't even get paid, and they're involved in scrutinizing laboratories—did you know that?—work for Senators for \$1 a year, scrutinizing laboratories. They're scrutinizing the Government, but of late they've seemed to focus on the laboratories.

I guess I'm very much worried about how we make sure we structure, if we're going to restructure, so that there are not over responses to scrutiny. Scrutiny is wonderful, but all scrutiny isn't equal, and all scrutiny should not require that you change the baby's diaper, and it would seem to me that we've got to have a stronger system that responds to scrutiny, and that scrutiny be scrutinized.

Would you believe that I have of late spent some time trying to think about setting up something that would look at those who scrutinize the laboratories and find out whether their scrutiny is valid or not, as much as—I notice you're laughing, but for me it was no laughing matter, it's very, very serious, but I gave up the idea once I thought of it.

But could any of you address that? Perhaps it has no effect on you, but I will tell you, the other day I brought for the committee what you should be interested in, the contract that exists between the University of California and Los Alamos when it started, and

recently, and the contract was about this thick when they started it, and it's about that thick over the years, while we say we've maintained the same contract, and we understand that that one that's that thick also has a shelf full of regulations that are related to it.

I guess I'm just going to lay that before you and tell you that I think what I've just described is an enormous problem. We have not much time, a couple of minutes for a few observations. Do any of you have an observation?

Dr. Schneider.

Dr. SCHNEIDER. Thank you, Mr. Chairman. I think your anecdote has, in fact, squarely pointed at the manifestation of the problem of layering and of supervision that does not add value to the process.

I would be pleased to make available the resources of the Defense Science Board to assist the committee in working on examining some of the successful examples of where the needs of public policy have been achieved, that is, the expenditure of appropriated funds is made with full compliance with the law, compliance with the security regulations and law of the U.S. Government, and yet the mission is successfully undertaken. I think the staff would find it rewarding to look at some of these successful examples and perhaps derive some of them for the benefit of the national labs that you're dealing with.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you. Please make them available.

Dr. Gibbons, do you have any observations?

Dr. GIBBONS. Shakespeare, Richard III, Act I, first we will kill all the lawyers.

[Laughter.]

Dr. GIBBONS. I think we tend to proliferate our details of governance, especially if we have more time on our hands than we should. That's beside the point, but I do believe that—I'm not sure, quite honestly, that the Defense Department is a good example for us. If DOE had the overruns that we've had in our military systems, DOE would be out of business, quite frankly, I believe.

I think we need to look everywhere for the best advice and best experience we can encounter and put it all together. I'm not sure we have the mechanism for doing that. It's conceivable that the national academies could be a mechanism for providing that, since they have both industry and science together, but we lack the capability for that kind of analysis and review.

The CHAIRMAN. Dr. Spencer.

Dr. SPENCER. I think you put your finger on the major issue in this. Let me give you an example of going back to the formation of SEMATECH in 1986 or 1987, and how that was done. This was a small amount of money, \$100 million from the Government, another \$100 million from private sources. You know, it's not the \$7 or \$8 billion you're talking about in the weapons laboratories, but that was set up, it was managed entirely from the private side with the Government providing money and a small amount of oversight. My friend here on the right is going to tell me how much in just a minute——

Dr. REIS. I'll be glad to do that.

Dr. SPENCER [continuing]. Since he was involved, but at the end of 5 years, after the GAO sat in our laboratories in Austin for 5 years and watched us on a daily basis, they wrote a report which I thought was rather extraordinary that said, here's an example of private management of government funds to the benefit of both parties, and I think that's a model which might serve as a way to get where you want to be in this management of the laboratories.

I believe you've got to get a clear understanding from the Government as to what they want in the management of these laboratories. I happen to believe that we had science-based stockpile surveillance way back in the seventies, when a few of us pseudo-scientists worked on weapons problems, and if that's what it is, the Government needs to clearly identify what that is, and industry has to say, we'll be involved, but these are things that we need, and I think if you could get those two ideas and then negotiate something in the spirit that SEMATECH was done in the mid-eighties, you might find something to meet all of your requirements.

Dr. REIS. Let me come out of that, because I was the other person in the Government who was in charge at the time. I was Director of DARPA, who was given the responsibility of working with SEMATECH, and it really was pretty simple. I went down and talked to Bill, and we worked out an agreement. First my predecessor did, who probably did most of it, Greg Fields, and then I came along and said, what's this thing all about, and he explained to me, and we set up a series of rules and we had a program manager who kind of looked at what they were doing, but it was clear they had the full responsibility of producing what they said they were going to do, and we said this was going to last for 5 years or something, and this was the funding profile, and there were some bumps along the way, but because we trusted each other, and had clear goals, we were able to get through all those bumps, and I think it's fair to say that it was a successful operation.

But there was a difference there, and there's a difference that we shouldn't forget. Nuclear weapons is not a business. It really is a sacred trust. It's what's keeping us out of World War III, and it will keep us out of World War III hopefully for the remainder of civilization, so it's very different.

I had quite an experience, for example, when Lockheed, an excellent company, took over the Sandia Laboratories. When they first came over I guess it was the Martin Corporation, and they took over from Ma Bell. The management came in, 11 people were sent over from the Martin Corporation to help the manager. Within a year, 10 of them were gone. They really didn't add very much benefit.

Why? I'll tell you why. It was because Sandia was a very well-run organization, and it's still a very well-run organization. I mean, Paul Robinson and that group of management he's put together is as good as any corporation in this country, and I'll say that flat. I mean—and they have a very good independent board, okay, which Lou Allen, and some of the other people who are on that are not, you know, pushy, pushovers in any way, and that's basically run for them. Essentially, though, they're independent, for all in-

tents and purposes they're really independent of Lockheed. Lockheed lets them run it, but they run it very, very well.

We talked earlier, and Bill made it—we didn't talk ahead of time, but our experience with Lincoln Laboratories, both when I worked there and then when I was on the other end of that, because we were able to focus on what that mission was, so we got the customer, in this case, the customer is the Government, directly involved in that board.

But the issue we come back to, Senator, and all of you mentioned, is that we've got to work on the right end of the problem. It's not on the laboratory end, it's on the Government end. That's where all the oversight shows up.

The CHAIRMAN. Would you all excuse me, I have to leave, but Senator Bingaman will close the meeting shortly. Thank you.

Dr. REIS. So it's important, and the issue really comes back to that whole idea of who's—it's not so much who's in charge, but how do you trust the people, who's working for whom, and as Dr. Hecker gave in his testimony at the last meeting, that trust essentially is broken, and the way the Government has tried to respond to that is by more and more and more in oversight, and more and more in layers.

So the board is helpful, but the board is not the whole problem. You've really got to work the problem from the Government end as well as from the laboratory end, and that's where the trust comes in. That's where I thought my example of trying to bring people from those laboratories who had real experience, and they could be from the Government or whoever your customer is as well, and from the military, into working those positions within the Government.

They could be there for 4 or 5 years. They could be there for several years, and vice versa, and get people from the Government participating in the laboratories. That's the only way you get trust, is by working together on a common goal.

What's different now than it was perhaps 10 years ago is that there really is, for the reference laboratories at least there's a clear mission, so everybody can work on the goal. That's a big help and, indeed, that's why we're being successful now, is because the people in the laboratories are focused on that mission. They really don't care that much about—I mean, you know, about pension systems and all the other things. They really care, and they're devoted to making that mission.

That becomes also an issue in terms of, when do you get business in? You know, I'm on one of these advisory groups, and one of these laboratories was run by a company, and I said, what's your goal? What are you trying to do, and they said, I've been told I've got to increase my market share by 5 percent. Now, that's not what you want in a Government laboratory. They're not supposed to increase market share. What they're supposed to do is go for the mission. In fact, if they're not getting that mission they should close their market share. They should close up business and go off and do something else.

There's a real danger in trying to bring, if you will, a corporate culture in. It doesn't mean the corporate people aren't just as patriotic, or whatever, but that understanding what the goal is and

what the mission is, and believing it, and having the passion to devote your career to those sorts of things, that's what you have at the weapons laboratories now. That's what's made them what they are today.

That's what you have at places like Lincoln Laboratory, is you have sort of a different culture now, and that culture can be combined if there is a science, with the university culture, so it isn't really—and you don't expect to get management from university, right? I mean, that's the last place in the world, right, where you want, quote, management expertise, but you do get that scientific understanding. You get that asking of questions. You can't help it, right? They'll ask you all those kinds of questions.

That's the thing that you don't want to lose as you think about improving the management, if that's the problem, particularly at the weapons laboratories.

Senator BINGAMAN. Did you have any additional questions?

Senator ALEXANDER. No, I have two quick comments, Senator. One, it sounds like, still sounds like maybe the university culture and the corporate management, if you could borrow both of those at the same time, might be helpful. Everett Dirksen said that consistency is the hobgoblin of small minds, which he stole from some Englishman who was dead at the time. I don't know who. Do you know who it was?

Senator BINGAMAN. I thought that was Emerson.

Senator ALEXANDER. No, I think—it wasn't an Englishman. He borrowed it from someone else. It may have been Emerson.

Dr. REIS. Foolish consistency.

Senator BINGAMAN. Right. Thank you all very much. I think it's very good testimony. There may be additional questions that some members want to propound in writing by the end of the day. If so, we'll get them to you.

Thank you very much.

[Whereupon, at 11 a.m., the hearing was adjourned.]